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Stairway to Excellence Country Report: Latvia

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Abstract

In the frame of the Stairway to Excellence project, complex country analysis was performed for the EU MS that joined the EU since 2004, with the objective to assess and corroborate all the qualitative and quantitative data in drawing national/regional FP7 participation patterns, understand the push–pull factors for FP7/H2020 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed by the IPTS/KfG/S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on analytical framework developed by IPTS.

Contents

EXECUTIVE SUMMARY

Latvia has a solid track record regarding its participation in the European Structural and Investment Funds (ESIF, called Structural Funds [SF] in the previous programming period) and relatively little success regarding its participation in Framework Programmes (hereinafter - FP)/Horizon 2020 programmes. A research made by an independent entity in Central and Eastern Europe, a limited liability company within the KPMG[1] International network, shows that the payment ratio (EU structural fund grants paid to the total fund budget available) of Latvia in the programming period 2007-2013 was above the average one for Central and Eastern European countries (70 percent in Latvia's case and 63 percent on average).[2] On the other hand, the sixth FP7 monitoring report indicates that during 2007-2012 Latvia was the country with the second lowest number of EU financial contribution per applicant in retained proposals for FP7 calls.[3] In 2008-2009, Latvia experienced a severe financial crisis which was followed by budget cuts to public research organisations (PROs). During the crisis, SFs (now ESIFs) were distributed based mainly on need rather than on a competitive basis. Despite the fact that taking such an approach was rational and beneficial at the time, it effectively created a system whereby Public Research Organisations (PROs) and Higher Education Institutions (HEIs) became heavily reliant on continued funding from SF/ESIF. Moreover, it is notable that in the period of 2007-2013 a large part of the funds in Latvia went to reinforce market successes rather than to address market failures.[4] The main actors in the R&D Structural Funds governance system in the programming period 2007-2013 were the Research and Innovation Council (RIC), the Ministry of Education and Science (MoES), the State Education Development Agency (VIAA), the Ministry of Economics (MoE), the Investment and Development Agency of Latvia (LIAA) and the Central Finance and Contracting Agency (CFLA). Recently, Latvia introduced some changes in the ESIF governance system for programming period 2014-2020 – concentrating the administration of the funds in the hands of one coordinating authority, namely the CFLA, with the aim of decreasing costs and increasing efficiency.

For the purpose of this report 25 interviews were held with representatives of parties related to EU fund governance either from the policy-making, research or business perspectives. Among the people interviewed there were representatives of the business community, researchers from PROs and HEIs, policy-makers from the ministries central to research and innovation as well as funding allocation. The interviewee list also includes public officers from governmental funding agencies and the National Contact Point (NCP), representatives of the Cabinet of Ministers, the Chamber of Commerce and others. Part of the interviewees were first sent questionnaires developed in cooperation with the Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS) and then expressed their opinions during face-to-face semi-structured interviews while several other interviews were held over the phone.

Several of the system's strengths were identified by the interviewees:

- The project selection process and determination of eligibility criteria are perceived as being transparent and free of corruption;
- The high involvement of all stakeholders, including the government, society, the business community and the education and science sectors in the policy development process – for instance, according to the interviewees, Latvia effectively used the requirement to develop RIS3 and build an effective platform wherein stakeholders could communicate and involve R&D developers in policy building;

[1] http://www.kpmg.com/cee/en/pages/default.aspx

[2] KPMG in Central and Eastern Europe (2014). *EU Funds in Central and Eastern Europe. Progress Report 2007-2013.* Retrieved from: https://www.kpmg.com/SI/en/IssuesAndInsights/ArticlesPublications/Documents/EU-Funds-in-Central-and-Eastern-Europe.pdf

[3] European Commission (2013). *Sixth FP7 Monitoring Report.* Retrieved from: http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/6th_fp7_monitoring_report.pdf

[4] Market success here refers to relatively safe hard investments for capital replacement or extension which have proven to pay off in the past. Market failures are defined as hard or soft investments of more challenging and risky nature that could be value adding but have not been sufficiently developed. For a more detailed explanation see section 0.

- The development of a Smart Specialisation Strategy contributed to a more inclusive and transparent policy building process.

The main weaknesses were identified as:

- The lack of trust between R&D developers and policy-makers, as well as among policy-makers;
- The small research base – less than 6000 R&D jobs, including PROs, HEIs, business organisations and government placements. Negative demographic tendencies and ageing of current researchers might contribute to the further shrinking of it;
- The skill gap is considered to be one of the biggest development challenges by the business community and backed by discussions in reports by the Ministry of Economics;
- The excessive bureaucracy and documentation in selection of projects, administration and control processes;
- The heavy reliance on the accessibility of ESIF/SF due to extensive use of needs-based (as opposed to competition-based) fund distribution approach
- The basis of project selection and evaluation procedures solely on quantitative and qualitative criteria instead of a combination of selection criteria and an assessment/peer review by an expert;
- The inappropriate evaluation and control mechanisms applied to projects related to innovation support – using the same approach for both innovation related projects and infrastructure projects;
- Inefficient procurement law – too strict of an interpretation of procurement law by the Public Procurement Bureau.
- The tendency to allocate more funding to "hard investments", such as investments in infrastructure, that are already familiar and have a low risk profile rather than "soft investments" like human resources. Such tendencies are also observed in the context of the public research infrastructure - infrastructure investments amount to €181m, which constitutes 72% of total investment in R&D (Table 2). Even the Ministry of Education and Science of the Republic of Latvia, in its answers to the Parliament on January 2014,[5] acknowledged that innovation capacity includes both capacity of the human resources and international competitiveness and research infrastructure.

One of the biggest challenges for Latvia will be the consolidation of its research system - decreasing the number of institutions by more than half (from 44 to 20) over the next four years. As mentioned in the interviews by a policy-maker from the Ministry of Education and Science and successful R&D performers, it would be politically challenging and competitive, and ESI funds could be used as one of the tools facilitating this process.

As also mentioned by the interviewees, another important challenge for Latvia will be to implement the changes that have already been planned. This challenge would be in place due to a very cautious, conservative thinking and risk averse contingent within the policy-makers and executive bodies. The challenge is further amplified by a very low margin for error allowed by the audit-led evaluation approaches that limit the ability to implement change.

Some of the above-mentioned policy changes that have already been implemented or predicted for the period 2014-2020 are related to the Smart Specialisation Strategy and are as follows:

With regard to transparent and comprehensive policy building process;

- Focus on peer-review and international expertise in evaluation and monitoring of the projects;
- More focus on building human capacity in the area of research and innovation;

[5] The Ministry of Education and Science of the Republic of Latvia, "Answers to the questions to parliament", Letter (Latvijas Republikas Saeimas Kancelejai, 2014, gada 29. janvārī
http://titania.saeima.lv/LIVS11/saeimalivs_lmp.nsf/0/d75e578f43c07ab9c2257c6f00512fb6/$FILE/1_21-11_14.pdf

- Focus on consolidation of fragmented higher education and research systems;
- A new approach to policy design - fewer objectives and goals, more focus on innovation and closer to market approach;
- More focus on building of excellence in science;
- Entrepreneurial discovery as part of the policy cycle;

Synergies between SF and FP are very few and limited. A separate work submitted with this report is a case study[6] which describes the synergies of using SF and FP funds by the Latvian Institute of Organic Synthesis. The synergies taken place in Latvia are not seen ex-ante; they are more coincidental coming from the nature of the programmes. In the interviews, the stakeholders very highly rated the FP/H2020 projects in terms of their impact on development of R&D capacity and expertise. Thus, the rationale for participation is acknowledged by the R&D performers. To successfully apply for such programmes, Latvian researchers, engineers and organisations have to consistently increase their international exposure and establish a better network. They also should have a solid track record of performance in order to have a chance at being invited to join an international consortium. As the most important factors that matter for being invited to such consortium, the interviewees mentioned networking with international peers and reputation. SF/ESIF can, in this context, be viewed as a valuable tool having the potential to facilitate admission to the Framework Programmes. On the other hand, the benefits gained through participation in FP/H2020 programmes might motivate the researchers/institutions to use other funds (including SF/ESIF) more efficiently.
The main policy suggestions proposed by this paper include:

- Focusing on human capital building in R&D as the primary goal of development;
- Focusing more on the number of R&D jobs rather than on R&D spending in monetary terms;
- Simplification of the ESIF programmes, bringing their project selection, controlling and administration systems closer to those of H2020/FP;
- Taking the principles of entrepreneurial discovery into account when building policies related to research, development and, especially, innovation (R&D&I); this would imply that, among other things, the policies should take into account the existence of different reasons of the project failures and respond to them respectively. The projects, which did not reach the initial objectives due to different reasons than fund mismanagement but eventually contributed to stock of knowledge, should not face financial contraction by default. On the other side, if the reason behind the project failure is mismanagement of the funds, such enforcement would be applied.
- Focusing more on soft investment in business support or more ambitious "hard investment" – high tech, more risky projects, like first scale production or advanced manufacturing capabilities (for more detailed discussion see section 2.1.1);
- Conditions and restrictions imposed by the European Commission that would enable undertaking new, less familiar policy building approaches. One of the key provisions required, as observed during the interviews by the author of the report, is adjusting the consequences imposed by the European Commission regarding SF projects of first scale and advanced manufacturing capabilities that often do not reach intended goals. Such strict consequences will shape future policy choices more than any policy suggestion or evaluation document.
- Changing procurement law to include simpler and more effective public procurement principles;
- Giving priority to ESIF to finance the projects that have applied on H2020 programme, passed the thresholds but did not receive the H2020 fund (as one of the ways to facilitate participation in H2020 programmes);
- Regarding RIS3 – allowing for complementary specialisation areas rather than just unique competences

[6] The case study is available at http://s3platform.jrc.ec.europa.eu/cases-studies

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Disclaimer

1. INTRODUCTION

Background of Stairway to excellence project

The European Commission Framework Programme (FP) for Research and technology development has been vital in the development of European knowledge generation. However, there is considerable disparity across EU countries and regions in terms of FP participation and innovation performance.

Horizon 2020 will continue to provide funding on the basis of excellence, regardless of geographical location. However, it will also introduce novel measures for "spreading excellence and widening participation" by targeting low Research & Innovation (R&I) performing countries - most of whom are eligible for innovation funding under Cohesion Policy for the period 2014-2020.

In addition, the new regulations for ESIF aim to use funds more effectively to build regional/national excellence and capacities. By doing so, the key funding sources (ESIF and Horizon 2020) can complement one another along the entire innovation process.

Objective of S2E

The Stairway to Excellence (S2E) project is centred on the provision of support to enhance the value of the key European Union (EU) funding sources for research, development and innovation: European Structural and Investment Funds and Horizon 2020 but also the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME), Erasmus+, Creative Europe, European Union Programme for Employment and Social Innovation ("EaSI") and the digital services part of the Connecting Europe Facility by actively promoting their combination. The project has two main objectives, namely:

- Providing of assistance to regions and countries that joined the EU since 2004 in closing the innovation gap, in order to promote excellence in all regions and EU countries;
- Stimulating the early and effective implementation of national and regional Smart Specialisation Strategies.

Main purpose of the document

In the frame of the project, complex country analysis is performed for all 13 EU MS with the objective to assess and corroborate all the qualitative and quantitative data in drawing national/regional FP7 participation patterns, understand the push–pull factors for FP7 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed the IPTS/KfG/S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on analytical framework developed by IPTS.

2. QUALITY OF THE GOVERNANCE

In Latvia, two ministries are in charge of designing the policies applied to research, development and innovation (hereinafter referred to as R&D, R&I or R&D&I); namely, the Ministry of Education and Science and the Ministry of Economics. The Ministry of Education and Science is mainly responsible for research and development and it has the leading role in designing RIS3 (Research and Innovation Strategies for Smart Specialisation) for Latvia, whereas innovation support is under the responsibility of the Ministry of Economics.

Considering the insights provided by the interviews that were conducted for the preparation of this report, the administration and implementation of policies in Latvia is generally considered as relatively effective with few issues in place (discussed in latter sections). Governmental agencies (e.g. the State Education Development Agency [The Latvian abbreviation used throughout the report – VIAA]) and policy-makers find that coordination is improving.

Based on the results of the interviews, development of R&I governance in Latvia is very rapid. During the preparation of this report, over the course of four months, significant changes in governance and strategies have been observed. Some of the issues related to governance of Structural Funds (SF) and European Structural and Investment Funds (ESIF) was emphasised by the interviewees. It has already been addressed by the new policies by the time that this report had been finalised. For instance, the extensive number of selection criteria that excessively constrained R&I performers in their projects, as discussed in section 2.1, have already been taken into account in the new programme proposals brought forward by the Ministry of Education and Science. Given the rapid and significant adjustments being made with regard to the European Union's (EU) fund management on the policy making level, this report should be considered as a snapshot of the situation at the time of submission.

General strategies and objectives of the EU funding programmes for the 2014-2020 period are set out in the "European Commission–Latvia Partnership Agreement for 2014-2020"[7] and the main management principles are regulated by the "Law on Management of EU Structural and Cohesion Funds 2014 – 2020 Programming Period"[8]. When it comes to promoting innovation, the national strategy is presented in the "Guidelines for National Industrial Policy for 2014-2020"[9], as well as in the "Guidelines for Science, Technology Development, and Innovation 2014-2020"[10] (the latter will be referred to as TDIG). The guidelines include the areas and goals of priorities to Latvia, guidance for their implementation and policy objectives. TDIG was developed on the basis of the Smart Specialisation Strategy for Latvia and the "Guidelines for National Industrial Policy". The conceptual model of the national innovation system is provided in Figure 1, whereas for a more detailed overview of the legal framework for EU fund governance see Appendix A.

The conceptual model (Figure 1) is presented in the "Science, technology development and innovation (STDI) guidelines for 2014-2020" to illustrate a new horizontal approach to science and innovation policy. According to the guidelines, the purpose of this structure is to bring the research and industry sectors closer, link them in a single system with compatible approaches to their policy issues and suggested solutions. STDI, under the horizontal policy, affects issues of economy and industry development as well as sectoral issues by developing science, technology and innovation, and are connected by organisations involved in transfer of knowledge and research, state institutions of political and administration levels, enterprises and infrastructure support tools. The guidelines emphasize that the positive impact of research and innovations depends not only on the actions of the involved institutions but also on their cooperation and their power to influence the legislative environment, social institutes' norms. The task of the state policy in this context is to

[7] Available at http://ec.europa.eu/contracts_grants/pa/partnership-agreement-latvia-summary_en.pdf;
[8] For more information, see (in Latvian) http://likumi.lv/doc.php?id=267471; accessed on 22/07/2015;
[9] Latvian version available at http://polsis.mk.gov.lv/view.do?id=4391;
English version available at https://www.em.gov.lv/files/nozares_politika/finl_en%20(1).pdf
[10] Available at https://www.em.gov.lv/files/nozares_politika/2014ino.pdf

analyse potential obstacles in the operation of all system components and react accordingly by offering solutions.

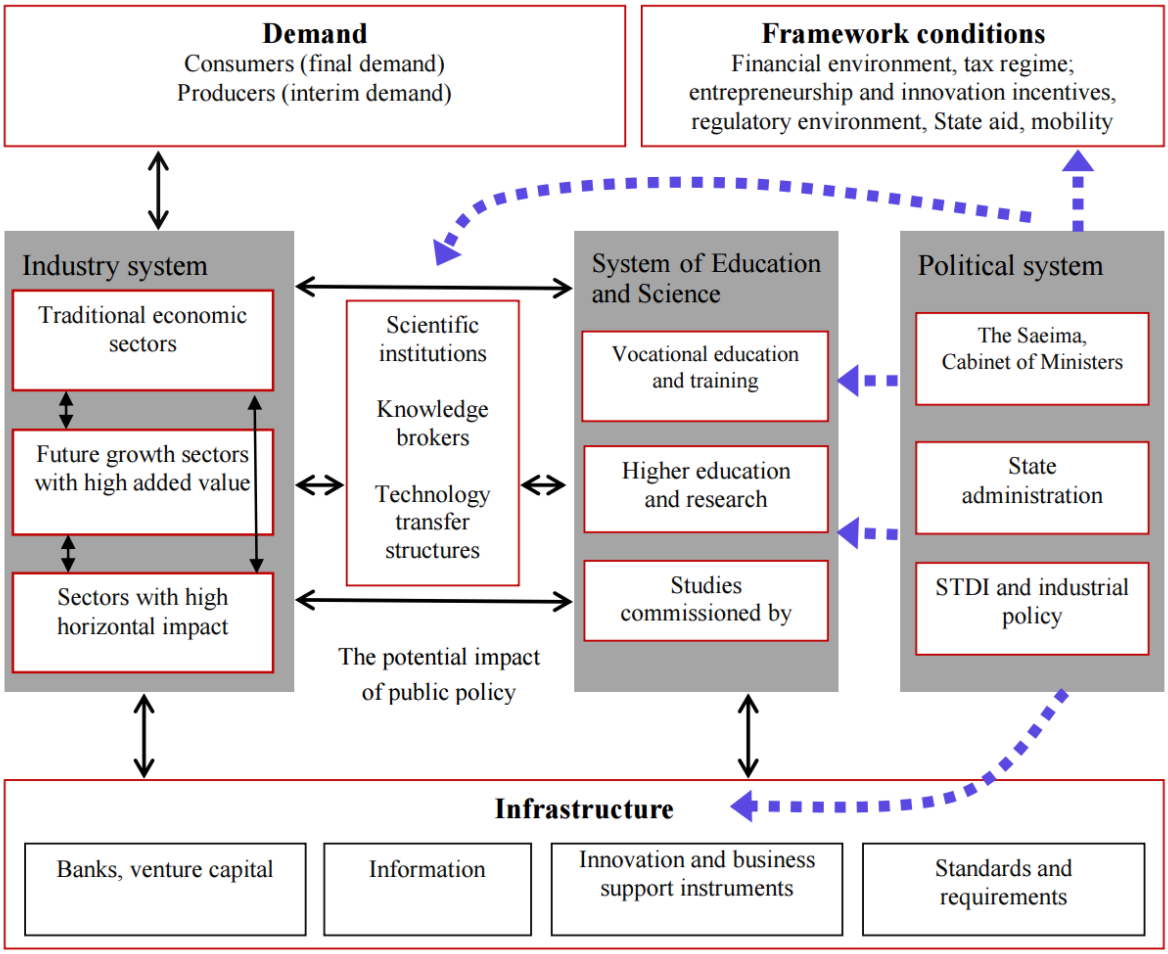

Figure 1. Conceptual model of national Science Technology Development and Innovation model[11]

The main actors in governance of research and development funds during 2007-2013 were:

- The Research and Innovation Council (RIC)
- The Ministry of Education and Science (MoES)
- The State Education Development Agency (VIAA)
- The Ministry of Economics (MoE)
- The Investment and Development Agency of Latvia (LIAA)
- The Central Finance and Contracting Agency (CFLA)

[11] Source; Cabinet of Ministers of the Republic of Latvia, "Guidelines for Science, Technology Development, and Innovation 2014-2020" (Riga, 2013. gada 18. jūnijā), https://www.em.gov.lv/files/nozares_politika/2014ino.pdf.

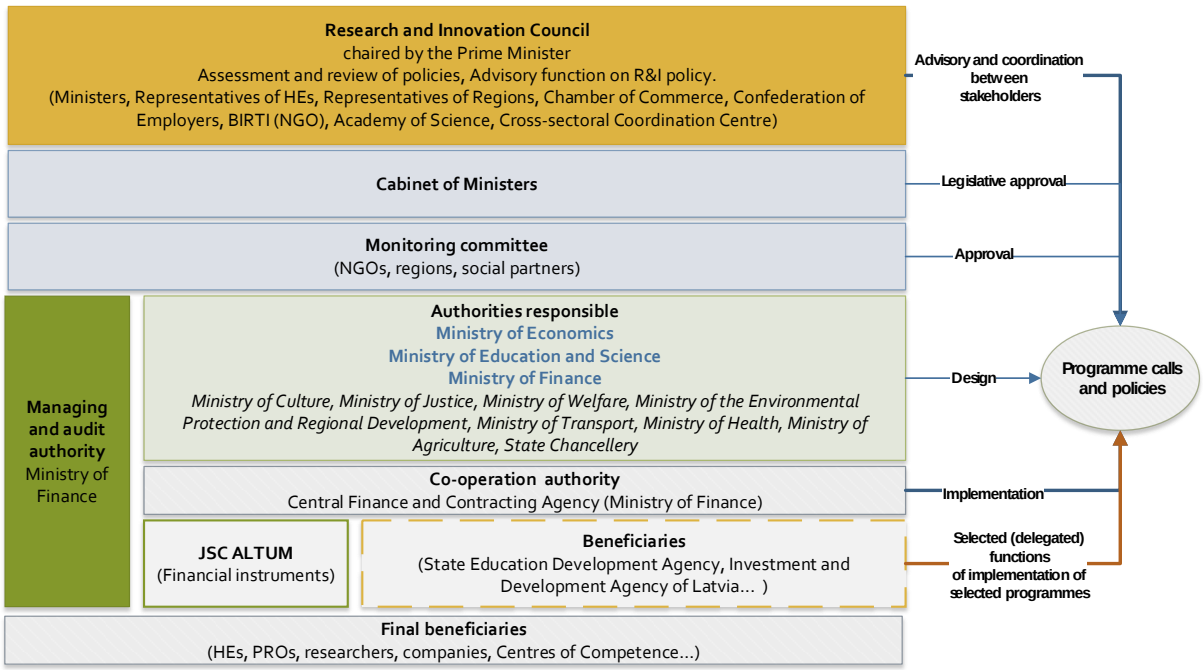

Figure 2. Organogram – agents involved in the governance of R&D funds (including ESIF for RDI) and their roles (figure created by the author)

The organogram (Figure 2) represents the functions of each body with respect to the EU Structural Funds programmes and policy design. The functions of the organisations in this context are presented next to the arrows on the right side of the figure.

When developing the Smart Specialisation Strategy, a need for a new institutional body - the Research and Innovation Council - arose. This body had to be prominent in the decision-making hierarchy so that it would have the authority to interrogate research and innovation policies and monitor the Smart Specialisation Strategy.

The Research and Innovation Council, chaired by the Prime Minister, advises the Cabinet of Ministers on important matters concerning the research and technology investments and evaluation of policy proposals. The Research and Innovation Council consists of Ministers, representatives of higher education institutions (HEIs), representatives of the regions, Chamber of Commerce, Confederation of Employers, Baltic Innovative Research and Technology Infrastructure (BIRTI - an NGO), the Academy of Science and the Cross-Sectoral Coordination Centre.

The Research and Innovation Council was established at the end of 2013. Throughout 2014, the Innovation Council held meetings on a weekly basis, usually on the day preceding the meeting of the Cabinet of Ministers. The Council generated input on policy decisions and became a platform for stakeholders to try to reach consensus regarding potential decisions to be made by the Cabinet. The Council contributes to a more inclusive decision-making process.

The Ministry of Education and Science (MoES) coordinates/governs the public research and education policies. It has the most important role in designing R&I policies, supporting project financing instruments and the Smart Specialisation Strategy. Specifically, two departments within MoES are in charge of the R&I policy planning and education:

- Department of Higher Education, Science and Innovations - responsible for policy design and monitoring in the fields of higher education, science, research, and innovation[12]

[12] http://www.izm.gov.lv/lv/ministrija/kontakti. Accessed 23.04.2015

- Department of Structural Funds – together with the State Education Development Agency (VIAA) - responsible for implementation of Structural Funds programmes[13]

Programmes designed by MoES are executed by the State Education Development Agency (VIAA). According to latest changes in ESIF governance, most of the functions of VIAA will be moved to CFLA during 2014-2020 period.

In 2013, the Ministry underwent significant structural and staff changes. The changes were initiated by the Minister Mr. Roberts Ķīlis (2011-2013), who came to the position with the aim of reforming the education, science and research sectors. The Minister launched these reforms by replacing the holders of key posts with experts who had been mainly educated in Western European or American universities or who had long-term experience working in international institutions. In March 2013, a new State Secretary was assigned, who before had worked in the World Bank, along with other new staff in key management positions. Based on the opinions of the majority of the interviewees, the new management completely changed the policy planning, and that marks the moment when policy planning became more inclusive and transparent. However, even after more than two years of gradual change, the current structure of the Ministry is still not sufficiently developed to efficiently carry-out the tasks related to the R&I programme design, for instance, time-wise. According to one of the interviewees, a representative of the policy-maker perspective, there is a mismatch between the functions and tasks of a department and the available expertise. Constant overload, which started with the process of design of the Smart Specialisation Strategy in March 2013, does not allow enough attention to be paid to the organisational changes necessary to solve the capacity problem. One of the obstacles preventing this change is budget limitations and a lack of resources required to employ the necessary expertise. The second issue stems from a long history of a dominant top-down management approach in the Ministry with limited information being provided to the employees of lower levels and no efficient task delegation system in place. Due to this inveterate approach, it is difficult to transform the current system into one having more autonomous and independent employees. Moreover, the current structure of the Ministry allows for too many underpaid, lower-level positions. Some attempts to overcome the above-mentioned obstacles and improve the efficiency of human resource management within the Ministry can be observed – adequate reforms are planned for the summer of 2015.

The State Education Development Agency (VIAA) is the largest agency under the Ministry of Education and Science. In the period 2007-2013, VIAA was the main coordinating institution of EU fund governance. VIAA mainly implements SF programmes related to education, science, research and some of the programmes targeting innovation. According to the information provided by the agency, by the end of the year 2014, VIAA had 173 employees.

The interviews conducted for the purposes of this report indicate that MoES is assigning VIAA with an increasing number of duties. Reflecting on the interviews held with MoES itself, such a tendency could be explained by the fact that VIAA has proven to be more efficient than the Ministry at a variety of tasks. Overall, VIAA has developed a more "business-like" internal culture where achieving outcomes is prioritised over issues related to the process of implementation. Interviews revealed that employees of VIAA, including those that have already changed their work place, unanimously agree that VIAA is managed effectively and efficiently.

In 2013, VIAA took over the National Contact Point (hereinafter referred to as NCP) with an aim to improve the efficiency of NCP's operations. The National Contact Point is presented and discussed in more detail in section 5.1. Moreover, even though it was replaced by the CFLA when it comes to the governance of ESIF R&D funds, VIAA is still expected to play an important role in its respective policy planning and policy design in the period 2014-2020.

[13] http://www.izm.gov.lv/lv/ministrija/kontakti. Accessed 23.04.2015

The Ministry of Economics (MoE) is responsible for the development of policies regarding business support and innovation. The departments of the Ministry of Economics, which are working connected with the EU Structural Funds, are designing, introducing and supervising SF programmes and projects related to enterprise support and innovation, whereas their implementation and administration is carried out by a direct subordinate of the Ministry - the Investment and Development Agency of Latvia (LIAA).

According to the interviews, the Innovation Department under the Ministry of Economics has only three positions that are dedicated to innovation policy design. It is not capable of successfully carrying out all the tasks that are expected of it. For instance, the involvement of the Innovation Department of MoE in the development of RIS3 was limited in comparison to its role. Given that RIS3 has a strong potential for having an economic impact, it should fall under the field of MoE's competence. However, as it has been observed in the case of Latvia so far, MoES (The Ministry of Education and Science) involvement in the development of RIS3 has surpassed that of MoE (The Ministry of Economics). Therefore, the leading role in the design of innovation policies moving forward will most likely still lie with the Ministry of Education and Science.

The Latvian Investment and Development Agency (LIAA) has traditionally been responsible for business support and the execution of its respective SF programmes designed by the Ministry of Economics, since 2004. However, unlike that of the VIAA and MoES, the relationship between the Ministry of Economics and LIAA has been rather complicated. The interviewees from the entrepreneurial side observed that the agency was strongly affected by its excessive focus on legal issues and documentation which has served as an obstacle to the efficient fulfilment of its duties regarding business support and innovation. In 2013 alone, there were six meetings of the Consultative Council dedicated solely to the improvement of performance of LIAA. Most of the discussions in these meetings revolved around the aim of decreasing excessive bureaucracy. In the period 2014-2020, the importance of LIAA in the context of EU funding will be reduced significantly as ESIF programme administration functions will be allocated to the Central Finance and Contracting Agency (hereinafter - CFLA).

In 2013, the Ministry of Finance started a consultation process on the best solution to improve absorption of funding, minimisation of costs and bureaucracy. As a result, with regard to the governance of R&D funds for the period 2014-2020, VIAA and LIAA have been replaced by the Central Finance and Contracting Agency (CFLA). Arguments in support of this change included the decreased costs and reduced chances of mismanagement and errors occurring. Cost decrease is expected due to a reduced number of institutions (i.e. CFLA as the central body rather than multiple subordinate agencies of the Ministries) involved in the governance of EU funds. Fewer administrative expenses are expected as a result of having a single consistent approach for every programme, while reduced chances for mismanagement and error are likely to be achieved by assigning the programmes to a single organisation and following a single approach.

Hence, during the 2014-2020 programming period, CFLA will be the only coordinating authority of ESIF. Given the increased importance of the organisation, CFLA has set out ambitious plans to increase its capacity (Table 1).

The structure of the organisation is expected to change as well, for example, through the development of separate competences to serve business customers. Nevertheless, it is still too early to assess the real capabilities of the organisation in the years 2014-2020 as it will depend on some unknowns, such as specific focuses that will be chosen by the organisation and on the expertise the organisation will be able to attract for the period.

During the interviews with various stakeholders, it was revealed that the new administrative body of EU funds is mostly viewed positively or, in some cases, neutrally.

Table 1. Planned capacity of CFLA (Source: The Ministry of Finance)

	23.04.2013	*Planned 2014-2020*
Project selection, control and management	109	350
Payments, budget	10	17
Legal support	5	8
KP VIS system development and maintenance	7	10
IKS IT systems development and maintenance	10	10
Programme monitoring	11	8
Consulting of customers and society	3	7
General support	28	11
Total number of employees	*183*	*419*

The problems of governance of ESIF

According to the interviews with various stakeholders as well as publicly available information, there are multiple issues related to ESIF fund governance that have a significant impact on the successful development of R&I in Latvia.

Based on the insights provided by the interviewees, the SF governance seems relatively free of corruption due to its transparent evaluation and project selection procedures. However, transparency of the process is achieved by an excessive list of selection criteria, not by basing the selection on an objective expert evaluation. This issue is discussed in greater depth in section 9.

Focus on speed of acquisition rather than on the impact

According to some of the interviewees, even lately the Ministry of Economics sometimes attempts to make the ESIF distribution process faster, even though this is not always the best approach, and it should be kept in mind that quality is always a priority over speed.

Lack of cooperative capabilities of the governing authorities

During the interviews, several policy-makers also raised concerns about the quality of cooperation between the governing bodies. While some issues remain in this regard, it should be noted that the interviewees agreed that it is improving at the management level. The Ministry of Education and Science, for instance, was leading the RIS3 process and at the same time closely cooperating with the Ministry of Economics at the departmental level.

Inefficient mechanisms meant for coping with potential mismanagement of funds

Most of the programmes in Latvia are created with an assumption that there may be some entrepreneurs and even researchers that could attempt to exploit the programme. Thus, the programmes and control systems in place often incorporate certain details, criteria, excessive documentation and/or other requirements that would cause fraudulent applicants to incur significant costs that would make their exploitation of the system seem less attractive. However, such an approach results in increased costs for legitimate programme participants as well, as pointed out by the policy-makers during the interviews.

Unrealistically high number and wide scope of project objectives

Furthermore, the SF programmes designed by the Ministry of Education and Science as well as the Ministry of Economics frequently have an extensive list of objectives that need to be met in order to receive the

funding. As an example, the programme 1.1.1.2 "Attraction of human resources to science"[14] was referred to during the interviews for having ten demanding qualitative criteria to fulfil. Such requirements drive applicants to write lengthy proposals which are rarely achievable. Very detailed objectives and requirements leave little room for input from the researchers, causing them to essentially design projects with very limited flexibility. Whilst it might appear that this approach is ensuring ambitious targets, it diminishes the roles of the project applicants by restricting their freedom to fully utilise their extensive knowledge to design projects in the fields in which they, unlike the policy-makers, are experts.

Other issues that the current EU fund governance system experiences include the prevalence of policy-makers' risk aversion and conservatism, and a control system focusing on the process control rather than the results, both of which are presented in-depth in section 9.

Soft versus hard investment

Hereinafter, the term "hard investment" is used to describe investments in infrastructure, machinery, construction and other capital goods, whereas "soft investment" refers to investment in R&D&I activities, education, human resources, social investments and the like. During 2007-2013, a significant amount of business support went to "hard investment" as investments in production equipment, while soft investments were not very popular to provide business support in Latvia. As it can be seen in Appendix B, in all years, except for 2010, most of Latvian business support went to hard investment instead of supporting innovation activities. The investment was provided in the form of grants to companies.

It should be noted that not all "hard investment" projects are equal. Typical hard investments during the period of 2007-2013 were simply targeting capital replacement and/or extension and the like. They usually had common features: already known products with few minor changes, an existing market ready for the product, high likelihood of success, reliable business plans based on prior experience and a mutual experts' and policy makers' agreement on high probability of success.

However, another type of hard investments could be addressing first scale production, advanced manufacturing capabilities and the like. The common features of these types of projects are: limited understanding and knowledge on potential market reaction; potential of disruptiveness; dispersed opinions of experts and industry leaders on the probability of success, general understanding that it is a risky adventure. In the mentioned period, such projects accounted for a very insignificant proportion of total hard investment projects. Anecdotal evidence suggests that these types of projects could have amounted to less than 5% from total hard investment projects. Attitude of funding agencies and policy makers to such kind of projects is generally negative. This is due to the several unsuccessful examples seen in the past, also including a recent case with possible negative consequences, which are not even fully known at the time of this report. At the same time, these types of projects have potentials to (and usually do) contribute to the stock of knowledge even if they do not reach all intended goals.

In the context of this report, when analysing past experience of business support or when discussing amplification of market success, the term "hard investment" is used to refer to the first kind of such projects. Due to the strong influence of the business community on the decisions made by the Ministry of Economics, part of the funds went to reinforce market successes rather than to address market failures.[15] One of the ways to define market failure is to refer to, for instance, a situation in which the company cannot obtain a sufficient return on its investment but at the same time this investment would have substantial positive externalities. Logically, it would be rational to subsidise the gap using public funding if the value of the

[14] The Ministry of Education and Science of the Republic of Latvia, "Noteikumi Par Darbības Programmas 'Cilvēkresursi Un Nodarbinātība' Papildinājuma 1.1.1.2.aktivitātes 'Cilvēkresursu Piesaiste Zinātnei' Otro Projektu Iesniegumu Atlases Kārtu," *LIKUMI.LV*, accessed April 22, 2015, http://likumi.lv/doc.php?id=252264.

[15] See Appendix D regarding the allocation of funds to soft (in this context comparable to, and can approximate, market failures) versus hard (market success) investments.

externalities exceeds the necessary subsidy. From the point of view of the companies, the situation is different. Solving market failures means that the company will receive funds to cover a negative return, i.e. the *net gain* from such a subsidy is small. Meanwhile, if the other option - enhancing market success or any regular activities - is subsidised, then the subsidy amplifies existing returns and the subsidy contributes to the company's profits. In the case of Latvia, parallels could be drawn with soft and hard investments, where soft investments were perceived as market failures and hard investments were viewed as regular market activities that could yield returns, and both had opportunities to be subsidised.

Unlike hard investment projects targeting basic productive capacity, soft investment instruments, especially ones meant to influence behaviour, usually make an impact in the longer term and undoubtedly produce positive externalities. The long-term effects, however, make it difficult to measure and demonstrate their impact in the short term, resulting in less frequent opportunities to convert the investment into a profitable business. In this sense, R&D activity itself is already a soft investment – its results are mostly intangible, and thus, any kind of efforts and progress made are more difficult to demonstrate to the policy-makers. It is especially true for programmes encouraging cooperation in R&D between science and business and the creation of R&D jobs in companies.

Taking into account the logical recipients' attitude towards hard investments enhancing productive capacity and soft investments (when both are subsidised), it is not surprising to find that calls for projects enhancing productive capacity are more significantly oversubscribed than calls of financing purely for R&D activities. Such imbalance might be one of the factors causing pressure from industrial groups on the government to return to grants for companies enhancing productive capacity or similar areas with their activities. Results of this pressure clearly appear in the latest presentation by the Ministry of Economics which again proposes to allocate around 80 million euros to grants for enterprises undertaking hard investments.[16] Unsurprisingly, the proposal has gained enthusiastic support from the business community.

Policy-makers' willingness to promote hard investments as capital extension or replacement is also understandable. There was a case of a clearly promising project, first of a kind production facility dedicated to a completely new product with potential to change the dynamics of the existing markets. The project, however, took too much time to discover the right methods of production, struggled to develop a market for their product and faced especially serious problems with generating sales. The company even had sought bankruptcy protection, and recently became insolvent. When it comes to such projects, attitudes towards the funding agencies and the owners of the companies would be of high significance. Namely, the attitudes of the government, and, even more so, the attitudes of the European Commission and the EU Audit Authority will affect policy choices in the future far more than any other type of policy recommendations by the EC. As an example, if the mentioned case will result in financial correction, it could contribute to the government seeking ways to finance the less risky capital extension projects overall in the future. The report of the State Controller regarding conclusions based on revision Nr.24.1-12/2014 with regards to sustainability of EU Funding investments mentions several failed projects and, as a result, calls for a less risky approach[17]. The report does not specify the reason behind calling for a less risky approach, however, one of the possible interpretations could be signs of more ambitious and challenging project avoidance.

[16] The Ministry of Economics of the Republic of Latvia, "Plānotais Atbalsts 2014.-2020.," accessed April 22, 2015, https://www.em.gov.lv/lv/es_fondi/planotais_atbalsts_2014__2020_/.
[17] http://www.lrvk.gov.lv/uploads/reviziju-zinojumi/2014/2.4.1-12_2014/informativais-zinojums_elfla_eraf_07.05.2015_tirraksts.pdf

Table 2. ESIF investments managed by VIAA by activity. (Source: Data provided by VIAA [2015])

	Infrastructure (thousands of €)	*Other (thousands of €)*	*Total (thousands of €)*
1.1.1.2. Attraction of Human Resources to Science	1 016	66 656	67 672
2.1.1.1. Improvement of IT Infrastructure and IT System for Research Needs	61 414		61 414
2.1.1.2. Support to International Cooperation Projects in Research and Technologies (EUREKA, 7th FP, etc.)	284	4 668	4 952
2.1.1.3.1. Development of Research Infrastructure	103 836		103 836
2.1.1.3.2. Improvement of IT Infrastructure and IT System for Research Needs	14 961		14 961
Total	181 511	71 324	252 835

Tendencies to concentrate on hard investment are also visible in the context of public research infrastructure. Infrastructure investments amount to €181m, which constitutes 72% of total investment in R&D (Table 2). The Ministry of Education and Science of the Republic of Latvia in its answers to Parliament on January 2014[18] notes that innovation capacity includes capacity of the human resources and international competitiveness and research infrastructure. Thus, investments in infrastructure should be balanced with investments in human resources development and creation. The latest research shows that currently (as of January 2014) acquisitions of new buildings, laboratories and equipment do not balance with investment in human resources, i.e. there are not enough researchers in many institutions.[19]

Lessons learned

The period 2007-2013 witnessed the financial crisis of 2008-2009 when SF funding was crucial to public research organisations to maintain their operations. At that time, the government organised SF programmes in such a way that funding was provided based on demonstrated need, without opening it up to a competition based on excellence. Several important lessons regarding research and innovation policies have been learned from this past experience:

- A mismatch between infrastructure and human resource investments results in an insufficient number of researchers given the existing infrastructure, which decreases the effectiveness of funding programmes;
- Lack of trust is the source of bureaucracy in SF funding. Trust building and more focus on peer-review based results evaluation should replace the excessive process control in ESIF funded projects;
- Expert-based project evaluation should replace the excessive list of quantitative/qualitative criteria;
- Current procurement law limits the effective use of funds rather than supports it;
- In Latvia, there is imbalance between support for hard investments and soft investments in favour for hard investments. The business community will always prefer to support hard investments as capital extension or replacement when given the option.

[18] The Ministry of Education and Science of the Republic of Latvia, "Answers to the questions to parliament", Letter (Latvijas Republikas Saeimas Kancelejai, 2014. gada 29. janvārī), http://titania.saeima.lv/LIVS11/saeimalivs_lmp.nsf/0/d75e578f43c07ab9c2257c6f00512fb6/$FILE/1_21-11_14.pdf.

[19] The Ministry of Education and Science of the Republic of Latvia, "Diskusiju rezultāti atbilstoši Viedās specializācijas jomām", Appendix, (2013. gada 28. decembrī), http://polsis.mk.gov.lv/view.do?id=4608.

- Given the past experience with failed projects combined with possible financial consequences for Latvia, government agencies are very reluctant to finance risky projects targeting first scale manufacturing, advanced manufacturing capabilities and the like;
- Excessive bureaucracy creates costs for funding agencies as well as R&I performers, however, it is not very effective against rent seeking or fraud;
- Quantitative and formal qualitative criteria should be replaced by peer-review based evaluation of the projects;
- The ambitious numbers of objectives for every programming instrument should be reduced as programmes can realistically only focus on a maximum of two or three objectives;
- Fragmentation of research and innovation systems is an obstacle to implementing competitive funding schemes;

There are also several support programmes that succeeded in the past and are recognised by various stakeholders and involved agencies interviewed as being good practice, and thus, should be learned from. Some examples are presented below.

- In business support:
    - Centres of Competence;
    - Support for Export activities to companies;
    - Support for Industry Clusters;
- In R&I and education:
    - Programmes supporting human resources that resulted in retaining some well-educated researchers in Latvia;
    - Programmes supporting Research Centres of National Importance[20] that started the consolidation process of PROs.

SWOT analysis of the governance of ESIF funds

The SWOT analysis presented below summarises and complements this section's discussion of EU fund governance and is based on both the current situation and the situation experienced during the 2007-2013 programming period.

Strengths:

- High involvement of all stakeholders in the policy development process, including government, society, the business community, the education and science sectors;
- Relatively transparent project selection process.

Weaknesses:

- Limited human capital in R&I in a very fragmented institutional system;
- Very fragmented higher education system;
- Heavy reliance and dependency on the easily accessible Structural Funds (coming from the science, and partly business, community);
- Reliance on "objective" criteria instead of expert assessment, also in cases of fraud or misappropriation of the funds;
- The same approach for evaluation and control used for innovation support projects and infrastructure projects;

[20] Research Centres of National Importance was an EU funded programme with an aim to concentrate research investments to several research centres that are important on a national level.

- Inefficient procurement law, and too strict of an interpretation of procurement law by the Public Procurement Bureau.

Opportunities:

- Opportunities to build better policies via entrepreneurial discovery, more innovative approaches and greater ambitions;
- Changes in institutional setting could create the opportunity to build a more efficient and flexible system. CFLA may introduce a more productive approach in control and management;
- Sensible political decisions, such as reduction of public R&I institutions from 43 to 20 by 2020, are already being considered and should be implemented in the near future.

Threats:

- Managing and coordinating authorities displaying conservatism and avoiding new approaches/solutions;
- New coordinating authority may avoid responsibility;
- The same approach for evaluation and control used for innovation support projects and infrastructure projects;
- Audit-led policy-making by the Ministry of Finance and the European Commission is a threat as it is usually strict and inflexible, whereas development of innovation, logically, requires entrepreneurial consideration and less-precise/pre-determined objectives. The strict approach does not allow discovery through trials; thus, prevents learning from mistakes;
- Given the extensive influence of interest groups, including but not limited to business organisations, a threat to the Smart Specialisation Strategy favouring the interests of such groups emerges.

Policy changes already implemented or foreseen for the period 2014-2020

The biggest changes regarding policy building began with structural changes in the Ministry of Education and Science in March 2013. Development of the Smart Specialisation Strategy (March 2013 - July 2013) was the first case in which policy-makers consulted with higher education institutions, public research organisations and private businesses at almost every step.

Undertaking the Smart Specialisation Strategy in 2013 changed the old approach to policy building to become a more comprehensive and transparent one. The process was successful in terms of increasing trust among stakeholders, especially between the government agencies, ministries and the business community. Reflecting on the interviews conducted for this paper one could conclude that trust building was gradual. At the start of the process in June 2013, it was very difficult to invite the business representatives to join in the discussion due to their perception that their recommendations would not be taken into account. Gradually, the business community understood that their input does affect the drafts of the policy documents after all. The information flow started increasing along with the increased level of trust in the process.

The Ministry of Education and Science led the process involving different stakeholders in the policy development process. The most significant events witnessed during this process in 2013 and 2014 were the following:

- Series of discussions with the academics, industry and education sectors, which consisted of five discussions split between different sectors of the economy: The discussion took place from June 18, 2013 to June 20, 2013, the results of which were taken into account in the development of the Industry Assessment for RIS3 Latvia and the report published after the event.[21]

[21] Cabinet of Ministers of the Republic of Latvia, "Guidelines for Science, Technology Development, and Innovation 2014-2020". The mentioned report is available at: http://www.ris3.lv/pazinojumi-un-jaunumi/zinojumsirpieejams

- Successive discussions regarding design and implementation of RIS3 policy instruments to support smart growth: Nine discussions took place from April 16, 2014 to October 15, 2014 with the aim of discussing with stakeholders a more appropriate design of policies in order to promote intelligent growth.[22]

Other less formal/documented discussions involving policy-makers and stakeholders occurred on a regular basis. The common opinion of industry representatives and representatives of PROs/HEIs is that communication and discussions provided sufficient involvement.

Proposals of new programmes by the Ministry of Education and Science show significant changes present in the approach to policy building. For example, a project for a new programme of support for post-doctoral research[23] has only one goal – the development of human capital. It has only two related objectives: (1) improved opportunities to begin a career in scientific institutions, higher education institutions and enterprises; and, (2) improvement of research competencies. International experts will perform an evaluation of applications based on three criteria: excellence, impact, and implementation. This national funding programme is also designed to give priority to proposals that have already proven to be of high quality. The prioritised proposals will, more precisely, be the ones that have applied to H2020[24], passed the thresholds but did not receive financing. The programme is expected to accept applications beginning in July 2015. Such programme design features are significant improvements – even when compared to relatively recent ones approved of last year.

To summarise, the policy changes implemented, or foreseen, for the period 2014- 2020 and related to the Smart Specialisation Strategy are as follows:

- Transparent and comprehensive policy-building process
- Focus on peer-review and international expertise in evaluation and monitoring of the projects
- More focus on building human capacity in the area of research and innovation
- Focus on consolidation of fragmented higher education and research systems
- A new approach to policy design - fewer objectives and goals, more focus on innovation and closer to market approach
- More focus on building of excellence in science
- Entrepreneurial discovery as part of the policy cycle
- More experimentation in policy building

It is expected that the process started by the Smart Specialisation Strategy would continue and provide constant feedback on policy successes and issues.

[22] State Education Development Agency (Throughout the report the Latvian abbreviation - VIAA - is used), "Discussion materials". Available at: http://viaa.gov.lv/lat/zinatnes_inovacijas_progr/viedas_specializacijas_iev/diskusiju_materiali/
[23] The Ministry of Education and Science of the Republic of Latvia, "PĒCDOKTORANTŪRAS PĒTNIECĪBAS ATBALSTS" (Riga, 2015. gada martā). Available at: http://www.izm.gov.lv/images/strukturfondi/IZM_SAM111_Post_dok_170315.pdf
[24] More precisely the Marie Skłodowska-Curie Actions (MSCA) Individual Fellowships (IF)

3. FACTORS THAT SUPPORT OR LIMIT THE NATIONAL PARTICIPATION IN R&D CALLS FUNDED BY SF/ESIF.

Reflecting on the interviews that were conducted and on the research carried out using publicly-available sources, it should be noted that there were no significant factors restricting the technical accessibility of SF/ESIF or reducing the R&D performers' motivations to participate in such calls. Nevertheless, there are factors that have had an effect on national participation in the calls for funding in a slightly different sense in relation to the Latvia's limited capacity for absorption of EU funds. This section presents a discussion of these factors, their reasons and impacts.

- **Limited absorption capacity of SF/ESIF funds**

In general, in Latvia there is a mismatch between available R&D&I funding for enterprises and the current structure of the industry and the number of researchers.

As mentioned, the R&D sector in Latvia has insufficiently developed when considering its human resources. The number of jobs in research and engineering is low and less knowledge intensive industries prevail (low-middle tech industries constitute 82% of manufacturing). According to the Ministry of Education and Science, the total number of R&D Full Time Equivalent (FTE) jobs in Latvia in 2013 was only 5,396; 3,237 in PROs and HEIs; 1,178 in the government; and 981 in the industry.[25] For reference, in 2011 the number of researchers FTE per thousand of labour force in Latvia was 3.8[26], whereas in Lithuania and Estonia respectively 5.7[27] and 6.5[28]. Another source, the "Informative Report on Medium and Long-term Labour Market Forecasts",[29] prepared by the Ministry of Economics, notes that the issue is unlikely to be resolved in the next five years. The report forecasts that there will be a surplus of specialists in the humanities and social sciences (a surplus of approximately 20,000 by 2020) and a shortage of life science, information and communications technology (ICT) and engineering science specialists (a shortage of approximately 20,000 by 2020).

According to the interviewees, this issue has not been adequately addressed through either efforts or programmes on a policy-making level that could motivate businesses to gradually shift to more knowledge intensive industries or create more permanent R&D jobs.

Moreover, as explained in section 2.1.1., opportunities to receive grants in both R&D fields and activities enhancing the productive capacity of the economy via hard investment as capital extension or replacement, shift the interests of the business organisations towards capital extension or replacement. This results in more grants being given and more projects being developed in the hard investment area, and thus, leaves the problem of the low number of R&D&I jobs unresolved.

All of these factors result in technical limitations on Latvia's ability to absorb the available SF/ESIF funds in R&D&I activities, especially given that the funding opportunities have only increased since the introduction of Horizon 2020. More information on the absorptive capacity limitation problem in Latvia is presented in Appendix E.

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[25] Ministry of Education and Science of Republic of Latvia, "SĀKOTNĒJAIS NOVĒRTĒJUMS „Pēcdoktorantūras pētniecības atbalsts" Eiropas Savienības struktūrfondi 2014.-2020.gadam", 2015. gada, 4, http://www.izm.gov.lv/images/strukturfondi/IZM_SN_SAM111_Post-doc_160315.pdf.

[26] Deloitte (2014). Researchers' Report 2014. Country Profile: Latvia. Retrieved from: http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Latvia_Country_Profile_RR2014_FINAL.pdf

[27] Deloitte (2014). Researchers' Report 2014. Country Profile: Lithuania. Retrieved from: http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Lithuania_Country_Profile_RR2014_FINAL.pdf

[28] Deloitte (2014). Researchers' Report 2014. Country Profile: Estonia. Retrieved from: http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Estonia_Country_Profile_RR2014_FINAL.pdf

[29] Ministry of Economics of the Republic of Latvia, "Informative Report on Medium and Long-Term Labour Market Forecasts" (Riga: Ministry of Economics of the Republic of Latvia, 2014. gada 12. jūnijā), 84, https://em.gov.lv/files/tautsaimniecibas_attistiba/DT2014_1.pdf.

Tendency to inefficient use of funds

During the financial crisis, the budgets of the research organisations were cut significantly (by up to 30%), and SF funding was used for compensation of the budget cuts. In many cases, the programmes were necessary to simply maintain research organisations' operations rather than develop them. For PROs, SF made, and still makes, up a significant part of the organisation's budget. While such an approach was reasonable and effective during the crisis, the consequences of it have created obstacles for the efficient use of EU funds. The extensive dependence of some organisations on the funds imposes limitations on the creation of a competitive funding distribution system. For them, losing funding for a project in any of the calls would mean that the organisation would not be able to continue to finance its basic operations. Thus, in the period 2007-2013, R&D calls funded by structural funds were, to a large extent, characterised by their need, as opposed to competition expected by its nature. In combination with the limited number of researchers and engineers, excessive fragmentation of the research base and funding that is dependent on the number of Full Time Equivalent (FTE) has created an acute lack of incentives for R&D developers to strive for excellence.

It should be noted, however, that this was not always the case – the interviews revealed that there are multiple examples of programmes where SF were used efficiently and played an important role in the development of the R&D in Latvia. The SF programmes were an important factor in maintaining some of the leading scientists in Latvia by providing them with the opportunity to fund their research and build excellence. For them, international funding sources such as Horizon 2020 provide an important opportunity for further prosperity.

Limitations on commercial use of the research infrastructure

The possibilities to convert research infrastructure usage from non-commercial to commercial are limited by state aid rules although this infrastructure is funded by SF. These conditions commonly end up discouraging ambitious projects related to research infrastructure development, especially given that not only academics but also business representatives are potentially interested in using this infrastructure. This situation is limiting industry participation in project design and selection. At the same time, based on the interview results, businesses express their interest in the possibility of converting research infrastructure from pure research to commercial use under the right market conditions. However, they are not ready to participate in financing such infrastructure from the beginning. Such limitations lead to research infrastructure not meeting the current Latvian R&I industry's needs and thus have a limited impact on the transformation of the economy. According to a paper by Andrea M. Herrmann, industry transformation occurs only if available research infrastructure and capacities are relatively close to the scope of current industry challenges.[30]

Heavy administrative burden

According to the interviewees' responses, the current funding management system was created and developed under the tasks and rules of programming period 2004-2006[31] when the primary function of SF funds was capital investment to improve production according to international standards. Given that the goals were relatively easy to measure and could be verified by a third party, namely a certification institution of a particular standard, all the extensive controlling, selection and evaluation procedures only served to complicated participation. Applicants were expected to provide a very precise description of their predicted steps, along with elaborate business and investment plans. Plans had to be carefully followed and any changes, if requested by the applicant, had to go through a long legal process to be approved, frequently taking up to six months. Cancellation or failure of such projects resulted in the Agency requesting the funding be returned.

[30] Andrea M Herrmann, "Choosing and Successfully Sustaining Competitive Strategies in the European Pharmaceutical Industry", (Max-Planck-Institut für Gesellschaftsforschung, 2008. gada).
[31] Latvia joined the EU in 2004.

The same rules and regulations were carried over to the next period in 2007-2013 when programmes were, on many occasions, focused on the innovation and development of new products. Taking into account that uncertainty is an inevitable aspect of innovation, the same principles of programme design – requiring the outcomes of the project to correspond to the initial promised goals and timing precisely – were no longer appropriate, although they still applied. According to the interviews, the outcome of such divergence was beneficiaries reporting results that would be considered in line with the initial plans rather than describe the actual results achieved even though, in many cases, the results achieved or the products created were significantly different from those proposed. Such examples show that innovation cannot be approached using the same methods that are used for infrastructure projects and the like.

- **The inefficient procurement procedures**

Procurement procedures for EU structural funds are supposed to prevent fraud, rent seeking and agency problems. However, the mechanism results in the opposite in many cases. Most of the respondents recognised that the current overly bureaucratic procedures of procurement produce inefficiencies and contribute to the excessive administrative burden on R&I performers. As mentioned by the interviewees, foreign companies and producers of materials or equipment are often reluctant to cooperate with the tender candidates due to the excessive documentation required and the relatively low threshold for complicated public tender procedures. Thus, to be able to buy the goods from the producers, applicants tend to involve intermediaries, the only task of which is a formal application of the procurement process, provision and preparation of the necessary documentation and transfer of the goods. Typically, such a service costs around 20% of the original cost, sometimes even more, and that is how low thresholds associated with tenders can end up increasing the overall prices of the tender participants' products significantly.

Inefficiencies in the current procurement procedure are also an obstacle for the government agencies. The government is facing some problems relating to the recruitment of international experts for evaluation of various projects, as the law does not allow hiring experts based on their expertise but rather on the basis of their fees.

4. ENHANCING OR LIMITING THE SYNERGIES

The synergy between Structural Fund programmes and the Framework Programmes was the most difficult concept to comprehend or comment on to the interviewees. Hence, it could be concluded that the synergetic features of the two funding opportunities are either not very apparent or highlighted in Latvia. The few synergy-enhancing mechanisms in place were identified during the preparation of this report.

As presented in section 5, the interviews with R&I performers revealed that potential benefits from participation in FP7/H2020 programmes are significant and thus serve as a powerful motivation to participate. As discussed in the same section, to successfully apply for such programmes, Latvian researchers, engineers and organisations have to consistently increase their international exposure and networking, build their R&I capabilities, have a solid track record of performance in advance to have a chance at being invited to join an international consortium. In this context, ESIF, if used efficiently, can be viewed as a valuable tool having the potential to facilitate admission to the Framework Programmes. On the other hand, desire to participate in FP/H2020 programmes can work as a stimulus to strive for excellence and thus, put any prior funds to their most efficient use. Hence, it could be said that the existence of FP/H2020 already works as a cohesion tool.

Based on the interviewees' opinion, actual activities of the governmental bodies that would enhance the synergies are very limited – the government can facilitate sequential upstream funding and/or provide alternative funding to that of FPs. These are the two means raised by the R&D performers for facilitating the synergies of the different funding programmes.

In the first case, SF/ESIF provides means for R&I performers to build their capabilities and international exposure. The interviews show, however, that following this approach, SF programmes can include measures motivating and requiring beneficiaries to look for external funding after the project; for example, a limit can be applied, stating that a participant can apply and receive funding only once without finding external sources such as business organisations, international funds or Horizon 2020, afterwards.

The government providing alternative funding in this context would mean provision of financing for R&I performers who passed the threshold but did not receive funding from FP/H2020. Such a practice would first increase the probability of a project being funded as a result of participation in such a competition as seen in Horizon 2020; thus, have the potential to increase the number of applicants. Secondly, it would ensure an efficient and worthwhile use of the alternative funds given the quality of projects that apply for H2020 and pass the threshold. However, it would be difficult to implement practically as the alternative funding would have to be provided by all member states researchers of which are a part of the financed consortium. If a consensus of the respective member states is not reached, attempts to finance only a part of the consortium's FP7 project by SF/ESIF may result in a negative value given that networking and cooperation are considered to be a very important part of the FP7/H2020 project value, from the perspective of the interviewees.

5. PUSH – PULL FACTORS FOR R&I PERFORMERS TO PARTICIPATE IN FP7/H2020

Competitive programmes (i.e. Horizon 2020 and FP programmes) wherein R&I projects are carried out in cooperation with foreign organisations were recognised by the interviewees as being especially important due to having the most potential to close the innovation gap. Given the collaborative nature of the programmes, participation in them depends not only on factors related to R&I performers in Latvia but also those in other member states, especially in the more developed countries. The most important factor for successfully participating in FP or H2020 calls, according to the interviewees, is networking with international peers and reputation. Networking can take a variety of forms, such as private contacts and business/research contacts. Even indirect contacts – having previous experience of cooperation or contact with organisations or individuals related to other members of the consortium of interest - were pointed out by the interviewees as an important participation facilitator.

Participation patterns of Horizon 2020 show that R&I developers from the more developed member states are more likely to form a successful consortium; thus, the initiatives to establish consortiums usually originate in these countries. On the other hand, R&I performers from the lagging economies, like Latvia, have significantly higher chances of receiving the funds if they are invited to join such consortiums. In some cases, research organisations from the cohesion economies could be - and, as the interviews revealed, usually are - invited by the foreign and more experienced market players without possessing any unique capabilities that other members did not already have. According to the interviews from the participants in FP, often the members that initiated the consortium could carry out all the necessary activities themselves, however, having limited resources, they choose to focus on the field of their comparative advantage and outsource other activities to newly attracted partners.

Having established the principles of FP participation from the emerging economy's perspective, one could then summarise and categorise the existing push/pull factors in the following manner.

Motivating – advantages and factors that stimulate the R&I performers in Latvia to seek invitations from international consortiums:

- Opportunities to learn from more advanced partners, possibly leading to more business opportunities in the future, were mentioned as the key driver in participating in the programmes;
- Being able to operate under fewer rules and restrictions, as Horizon 2020 is more results focused. This motivating factor was mentioned by business entities (as well as by PROs) that have had success in the Framework Programmes and are looking forward to participating in new ones because they find FP/H2020 less limiting and more business oriented than SF (ESIF) calls;
- Opportunity to achieve more appealing financial returns if a proposal gets funded;
- Building international exposure and networks is an especially appealing factor as all successful participants in the programme are export/outward oriented.

Enabling factors – factors that could have the potential to increase the likelihood of an R&I performer from Latvia being invited to join a consortium:

- Developed networks and reputation of a local or international environment, or a personal one. Networks were mentioned by the previous programme participants as a fundamental requirement to be recognised;
- Experience in cooperation with other foreign partners, preferably under similar circumstances;
- Possession of valuable knowledge, competence or capabilities;
- Developed strategic vision and ability to execute the strategy at an organisational or individual level is required to make use of the opportunity. In most cases of successful participation in FP7,

organisations or individuals who demonstrate strategic and long-term thinking, as well as an ability to execute the strategy, are known to be able to deliver results.

Barriers – demotivating factors and a lack of capabilities related to the R&I performers from Latvia that limit the likelihood of an invitation and limit the motivation to participate:

- The costs and risks for project coordinators (R&I participants from the developed member states) associated with involvement of an unfamiliar partner from, for instance, a lagging economy, are high. This makes the developed country participants less likely to invite organisations from lagging countries (like Latvia), and these organisations from lagging economies less likely to attempt to attract their attention;
- Lack of strong commitment of the governmental bodies to co-finance infrastructure that is not financed by the FP/H2020;
- FP7/H2020 "competing" for researchers' attention with the national funding opportunities. National funding is generally easier to access and have a much higher probability of success. One might speculate that making the national funding competitive could work as a strong motivating factor for participating in Horizon 2020. This could be complemented with an introduction of clauses limiting the national funding available to researchers or institutions without attracting additional external funding;
- Limited research base excellence and fragmented research and development industry;
- Lack of awareness about the programme of the business community;
- Lack of NCP support for potential programme applicants – many interviewees rated it as minimal or non-existent.

6. Policy instruments facilitating the participation in (FP7) H2020/(SF) ESIF

The key message from the interviews conducted on instruments facilitating funding participation is that they do not play a critical role in affecting R&D participants' motivation. Programmes, like the Information Platforms for EU funds and the National Contact Point, are meant to provide information and guidance to SF/ESIF and FP/H2020 applicants respectively. However, the actual applicants identified them as having value only in the context of attracting new applicants – informing those who were not already aware of such funding opportunities or explaining the general application procedures.

The National Contact Point

The National Contact Point (NCP) is a structure responsible for the provision of information on Horizon 2020. Since 2014, NCP has been no longer subordinated to the Higher Education Study Development Centre under the Ministry of Science and Education but it has been rather managed by the State Education Development Agency instead. Reflecting on the interview results, it could be said that the role of NCP is increasingly important due to this shift of subordination, as being under the oversight of the executive body of education, science and research programmes (the VIAA) will bring the NCP closer to the needs of potential beneficiaries and applicants to the FP/H2020.

Successful FP participants, who were interviewed for this report, rated the support of NCP in the range of almost none to non-existent. The lack of support from NCP was especially emphasised by the representatives of business entities due to their impression that the organisation's activities were mainly focused on providing guidance to higher education institutions and public research organisations rather than the business community. Such mismanagement could be one of the potential explanations for the low level of participation in FP programmes.

Given the overall negative evaluations of NCP activities as well as the interviewees' general requirement of radical improvement in NCP performance, the change in subordination could be a positive sign towards improving the programme's supporting participation in FP.

Other instruments facilitating FP7/H2020 participation

As noted by the interviewees working in R&D, all the necessary information regarding the H2020 project, for instance, is publicly available and easily accessible. Thus, the informative function of the National Contact Point, discussed in the previous subsection, is, from their perspective, not very relevant. For the participants that are familiar with the funding programme, different types of support regarding FP7/H2020 participation were pointed out – in particular, all the policies or conditions enabling instruments that would cover part of the costs of preparation for Horizon 2020. The existing examples of such policy instruments are:

- Funding provided by the Academy of Science for successful FP7 (H2020) project proposals which pass the threshold. The funding can be used for any purpose and it works more like a motivational tool;
- Some of the ESIF funding is available to cover traveling, networking and some other preparation costs that interested applicants incur prior to the project commencing. The impact and effectiveness of this instrument should still be evaluated.

The general conclusion reached by the stakeholders interviewed is that it may be sensible if any support for participation in the Horizon 2020 programme was available on a permanent basis because ESIF programmes may not be flexible and responsive enough to be able to match the timing of different Horizon 2020 calls. Interviewees agreed that provision of funding only for preparation costs if the project in question passed the quality threshold might help contribute to avoiding excess bureaucracy. The amount per project mentioned in the interviews was a maximum of €30,000.

7. EVALUATION AND MONITORING MECHANISMS

Based on the "Law on Management of European Union Structural Funds and the Cohesion Fund"[32], the bodies presented below are in charge of the monitoring and evaluation of the SF/ESIF management and implementation. In addition, Ministries and executive bodies subordinate them to contribute to the evaluation and monitoring of projects in their respective fields – the description of the Ministries and other institutions involved in the governance of R&D funds are presented in section 2.

Managing Authority (MA)

The role of the Managing Authority in Latvia is undertaken by the Ministry of Finance with two of its departments being in charge of EU fund governance; the EU Funds Strategy Department and the EU Funds Monitoring Department. MA is responsible for ensuring the effective management and implementation of EU funds, the existence of a reliable monitoring mechanism and the evaluation of EU funds. With the help of other institutions and consultants, the Managing Authority prepares programming documents ensuring compliance with the EU partnership principles as well as intersectoral coordination of different EU funds, i.e. SF and Cohesion Fund. In 2008, following one of its duties presented in the "Law on Management of European Union Structural Funds and the Cohesion Fund", the Managing Authority established, and is still maintaining, the EU funds management and information system (MIS)

Audit Authority

The Ministry of Finance, or more specifically, its European Union Funds Audit Department, is also fulfilling the role of an Audit Authority. The Audit Authority is liable for providing the EC, the Minister of Finance and the State Secretary with assessments of the soundness of EU funds' management and control systems as well as assurance related to expenditure and transactions.

Monitoring Committee (MC)

The Monitoring Committee was established to ensure an effective EU fund monitoring system, which would pay special attention to the priorities and goals of the operational programmes. The Committee acts according to the rules and regulations set by the Cabinet of Ministers. The Monitoring Committee is composed of representatives from Certifying and Paying Authorities, the Audit Authority, Cooperation and Responsible Institutions, the Managing Authority. Moreover, it also includes social and regional partners and non-governmental sector representatives (See Figure 2). The Committee is chaired by the Head of the Managing Authority.

Procurement Monitoring Bureau

The Procurement Monitoring Bureau has a duty to provide examinations of the documentation and the process of procurement.

The "Guidelines for the Development of Science, Technology and Innovation 2014–2020", among other documents, provide the basis for defining the overall goals and macroeconomic indicators for the RIS3 monitoring system. To ensure that the monitoring system of RIS3 takes into account the broad scope of the potential impact with respect to public investment in science, technology development and innovations, three monitoring levels were introduced; namely, overall goals of the specialisation strategy, macro and micro level indicators. (For illustration see Figure 3). The overall goals include an increase in investment in R&D as a percentage of Gross Domestic Product (GDP), better position in the EU Innovation Union Scoreboard and efficiency in the processing industry. The macroeconomic level indicators, among others, include private sector investments in R&D as a percentage of total investments, proportion of innovative companies, the number of R&D personnel and graduates in R&D related fields. Micro level indicators are the indicators

[32] http://likumi.lv/doc.php?id=153465

contributing towards achieving the macro level indicators (available in Appendix C together with their relation to the ESIF support programmes and national initiatives). The report "Smart specialization strategy monitoring system"[33] indicates that the average annual funding related to RIS3 counts only 1.3 percent of the average amount invested in the economy over the past three years[34] in Latvia. This, according to the monitoring report, means that the monitoring and evaluation mechanisms have to separate the effects of factors extrinsic to the RIS3 properly, such as other policy measures (energy policy, education policy, improvements in the business environment and others).

Few problems associated with this approach could be identified:

The focus of the monitoring and evaluation system is still put on R&D spending in monetary terms rather than on increase in volume of R&D activity (following the latter approach the number of R&D jobs would be the best proxy for measurement of impact);

The results of policies regarding human capital development become apparent only in the long term which might even exceed the policy cycle (change of authorities), therefore, defining and tracking some short term effects, that would indicate gradual improvement, could be necessary.

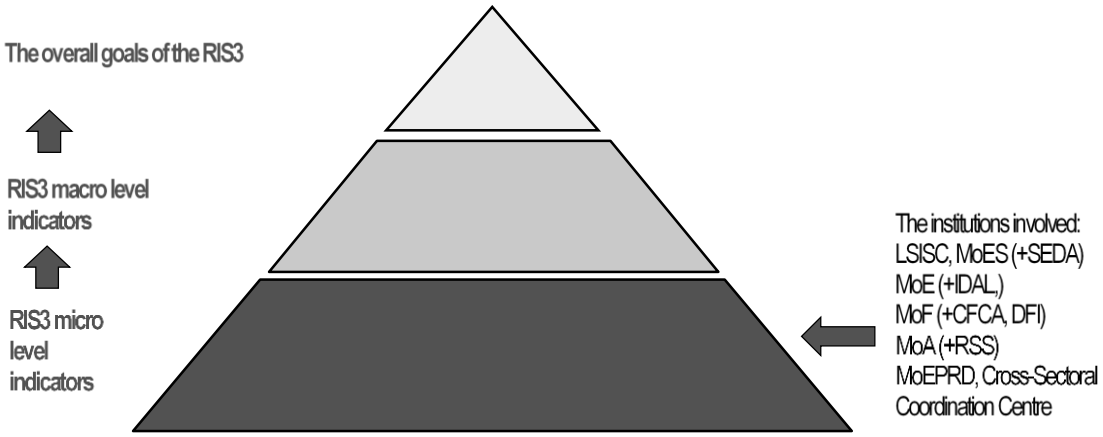

Figure 3. The concept of the RIS3 monitoring[35]

During the interviews with various stakeholders, several fundamental problems with the overall system of evaluation and its monitoring mechanisms were mentioned, including:

- Monitoring based on the process control: Managers of monitoring projects are not experts in the field; therefore, control is focused on the legal aspects rather than allowing a level of flexibility based on common sense and expertise;
- The excessive administrative burden for R&I performers, arising partly due to the previously mentioned lack of trust between the stakeholders, complicates the project evaluation and monitoring procedures as well. The reporting requirements are commonly too detailed and too demanding. It drives the funding recipients to produce extensive reports that do not necessarily and accurately depict the actual situation[36]. This reduces the transparency of the project implementation process. Many interviewees acknowledged this issue and expressed views that a potential solution might be

[33] Report by the Ministry of Education and Science of the Republic of Latvia; Accessible at: http://tap.mk.gov.lv/lv/mk/tap/?pid=40334802&mode=mk&date=2014-10-21 ;
[34] As of March 2015
[35] Source: "Smart Specialisation Strategy Monitoring System" by the Ministry of Education and Science of the Republic of Latvia.
[36] For instance, reports that require hourly based descriptions of progress/work were commonly admitted to be made up to a large extent. As interviewees explained, such an issue occurs simply due to R&D performers not planning and working on hourly basis.

based on the example of the Horizon 2020 programme by adopting a similar system of project selection and shifting the evaluation elements more towards the peer-review based result rather than the process control.

The local pool of experts for peer-review is insufficient which creates grounds to doubt the likelihood, and availability, of impartial judgement. The insights from the interviews suggest outsourcing to international experts as one of the solutions for this problem. As of June 2015, there have already been positive developments made in order to address these issues - the latest proposal from the Ministry of Education and Science for support of postdoctoral research projects[37] presently includes all the conditions listed above.

[37] The Ministry of Education and Science of the Republic of Latvia, "PĒCDOKTORANTŪRAS PĒTNIECĪBAS ATBALSTS".

8. TAKE-UP OF PUBLIC SECTOR RESEARCH RESULTS

Technology Transfer Offices

With an aim of encouraging innovation and, consequently, boosting EU's competitiveness on a global scale, the Technology Transfer Office (also known as Technology Transfer Centre) initiative was launched. The core role of Technology Transfer Offices (TTOs) is to assist PROs in managing their intellectual assets; so they could be developed further and have potential for commercial exploitation. Once technologies developed in PROs are properly protected by TTOs, marketing strategies are implemented to facilitate their market take-up. Therefore, TTOs are expected to play an important role in closing the gap between research and innovation. HEIs and research institutes qualify for support in the context of establishment and operation of TTOs.

Technology transfer development is one of the tasks presented in the National Reform Programme of Latvia and the National Development Plan for 2007-2013. The call for TTO launch took place in 2005 by the Ministry of Economics of the Republic of Latvia. The call resulted in six successful applications, and with the first support programme, funded solely from the national budget. Six TTOs were established at the Latvian HEIs. As a result of the second call in 2008, eight more TTOs were funded.

The interviews conducted for the purposes of this research revealed that the Latvian TTOs are facing a skill gap. The interviewees mentioned that there is a lack of experts that would be capable of both coherent understanding of the research brought forward by the PROs and a vision for commercialisation of it.

Competence Centres

A Competence Centre (CC) is a commercial entity founded by enterprises and research organisations which acts as an R&D project manager, coordinator and financing instrument exercising a high degree of autonomy in project selection, change and administrative decisions. It only finances the R&D activities of enterprises and research institutions having potential commercial value. A Competence Centre usually only provides co-financing and, in turn, requests co-financing from enterprise(s) sponsoring the project. Government involvement in controls of the daily operation of the Competence Centre is limited, mostly focusing on procurement procedures and controlling whether the Competence Centre is financing only R&D spending. The decisions of the institution are made by its Council which mostly consists of business and science representatives. Decisions are made quickly, and there is the possibility of cancelling the project or replacing it with a better one without any penalty if the project becomes commercially or technically unfeasible. Competence Centres are allowed to find the best model of operation and have operated relatively well doing that. This success of CCs can mostly be attributable to their financing model that is able to adjust and thus take advantage of windows of opportunity in the context of innovation.[38] Six existing Competence Centres have also significantly improved the communication between businesses and PROs.

Based on the interviews carried out for the S2E project as well as the meetings that took place in the process of RIS3 development, interviewees from the business community recognised the Competence Centre programme as an example of best practice. They listed the following benefits:

- Fast, business-like decision-making process: The business recognised that it is the first programme designed truly to support innovation. It is mostly emphasised that the primary reason for the positive outcome was based on the process and possibility of replacing unsuccessful projects quickly and inexpensively.[39]
- Providing the possibility to understand the capacity of research organisations.

[38] Opportunity windows herein refer to the point in time when the market opportunity matches the knowledge, research/innovation capacity, potential production capacity, and technology available.

[39] State Education Development Agency (SEDA), "VIAA » Viedās specializācijas ieviešana RIS3 » Diskusiju materiāli", *State Education Developement Agency (VIAA) Discussion regarding EU funds policy instruments for Strategy of Smart Specialization*, skatīts 2015. gada 21. aprīlī, http://viaa.gov.lv/lat/viedas_specializacijas_iev/diskusiju_materiali/.

- Enabling more efficient and faster communication between the business and science communities, possible by means of money.
- Because the number of R&D jobs in business is limited, Competence Centres have adequate finances available to encourage companies to plan R&D activities relatively long term while creating new permanent R&D jobs.

Programmes with similar "soft" effects are "Support of Industry Clusters"[40] and "Support for Export Activities of Companies"[41]. The Industry Cluster support programme offers a maximum funding of over €400.000 per cluster in order to facilitate cooperation between business entities, research, education and other organisations. The programme aims at boosting international competitiveness and innovation through covering costs of activities like cluster marketing and market research, human resource training within the industry, promotion of cluster international cooperation, promoting collaboration with the science community and others. The programme - supporting export activities - is under the responsibility of the Ministry of Economics and is coordinated by the Latvian Investment and Development Agency (LIAA). The programme promotes the export facilitating activities, brought forward by individual merchants and associations of them, public and port authorities, municipalities and others. The aid is intended for encouraging activities like participation in international exhibitions, international conferences while introduction or promotion of project's goods and services is taking place, as well as trade missions, contact exchanges, potential trade partner visits. Other types of activities eligible for the support under this programme are market research and assessment of products', partners', merchants' conformity and others. The programme offers a total of €13.759.576 from the European Regional Development Fund (ERDF) with a maximum per applicant funding amount of €200.000 for three years.

Problems limiting the take-up of public sector research results

Some proposals for, and possibilities of, improvement the take-up of public sector research results are identified in the "Strategy of Innovative Growth of Chemical and Pharmaceutical Industry of Latvia".[42] Mainly, the problem of the current law is that it requires the researchers to cover all the costs associated with the intellectual property even before the commercial value of the product is proven. Potential losses in the market for individual researchers are significant if the product turns out to be financially unfeasible or unsuccessful. Thus, it reduces the number of researchers pursuing the commercialisation of their research. This issue could potentially be addressed by allowing the transfer of intellectual property rights from the research institution to the researcher at the initial stage of the commercialisation process. Such setup may include the condition that the researcher would cover all the costs associated with the development of the intellectual property only in the event that it achieves a commercial success. It is expected that such change could improve the take-up of public research results. In such a case, researchers can use the intellectual property as part of the capital of the newly established start-up; and thus, this makes easier to acquire financing. On the other hand, it creates a greater likelihood of a research organisation being paid for such research.

Latvia is a small and relatively high-income country; therefore, it has a disadvantage in scale economies, i.e. manufacturing sectors. Latvia cannot compete in this context by increasing the scale and reducing production costs like some other economies. Latvia's population is less than 2 million and its GNI is $22,510 per capita.[43] At the same time, the country's medium-low and low-tech industries still constitute to 82% of the entire manufacturing industry. The size of the country also limits the possibilities for diversification in its innovation

[40] More information available at: http://www.liaa.gov.lv/invest-latvia/competitive-advantages/business-incentives/other
[41] More information available in Latvian at: http://www.liaa.gov.lv/files/liaa/attachments/2014.12.08.arejo_tirgu_apgusana.pdf
[42] Latvijas Ķīmijas un farmācijas uzņēmēju asociācija, "Latvijas Ķīmijas un Farmācijas industrijas inovatīvas izaugsmes stratēģija" (Latvijas Ķīmijas un farmācijas uzņēmēju asociācija, 2014. gada decembrī).
[43] Gross National Income at Purchase Power Parity in 2013; The World Bank, "GNI per capita ranking, Atlas method and PPP based | Data", *The World Bank Data*, 2015. gada 23. aprīlī, http://data.worldbank.org/data-catalog/GNI-per-capita-Atlas-and-PPP-table.

and productive capabilities, and it poses difficulties to create all the necessary cutting-edge science and technology for the new generic technologies. This effectively limits companies to niche and specialty products. Even if Latvia has some sectors with scale intensive production capabilities, these are limited to single enterprises, such as the role of Latvijas Finieris[44] in plywood production. Consequently, companies and PROs have to seek foreign partners in larger markets in order to be able to adopt the research for commercial uses.

To illustrate a case of research result take-up not being feasible for Latvian market players a large international enterprise from Latvia could be mentioned. The company was essentially participating in the FP7 project only so as to make contact with potential customers. As for the actual research commercialisation, the company estimated that in order to take-up research results, it should invest at least €25 million in a trial production facility to test the feasibility of the production of the new material developed during the Framework Programme project. The size of the necessary upfront investment was too large given the uncertainty of the testing outcomes, even if there was a certain possibility of additional state support. However, as it was discussed before, willingness of policy-makers to support enterprises to undertake such risky, *first of a kind* production or *advanced manufacturing,* projects is not yet clear. It will depend on the final resolution regarding failed advanced manufacturing or first of a kind projects from 2007-2013. Resolution of failed past projects will define whether Latvia will look to support such projects in the future.

[44] http://www.finieris.lv/

9. COUNTRY TAILORED POLICY SUGGESTIONS

Several country tailored policy recommendations could be drawn from the research conducted for the purpose of drafting this report. Some of the recommendations are logical conclusions that follow the analysis presented in the previous sections; others are explained in more detail here.

Enhancing the human resource capacities in the R&I sector

When it comes to the R&I policy in general, and the Smart Specialisation Strategy in particular, more attention should be paid to the creation of new and permanent R&I jobs and changes to the structure of the industry rather than focusing on R&I spending itself. The current number of R&I jobs (less than 6000 across all sectors) is too little. The goal of R&I funding should be to increase the volume of R&I activities, not to inflate price of existing volume of activity. Without increasing the number of R&I jobs, the latter will prevail. In a practical sense, it means that R&I funding schemes should be open in the longer term with future prospects of funding exceeding current R&D absorptive capacity. Thus it signals to R&D performers that creation of new R&D&I capacity via permanent R&I jobs is welcome. Requirements for R&I jobs and the volume of funding should be reconsidered if the demand approaches an equilibrium with the available funding. Policy makers should avoid situation when business accommodates the regulations in order to absorb funding in market success. It should also be mentioned that more attention by the policy-makers should be paid to the overall soft measures, affecting the behaviour of market participants, facilitating cooperation and coordination, providing support for industrial clusters and projects like the Competence Centres.

Eligibility, monitoring and evaluation policies and procedures should incorporate objective assessments by international experts

The evaluation and monitoring procedures should be modified to rely less on the quantitative or qualitative criteria and assign more weight to peer-review based analysis of the results of projects. In a country with such a limited pool of experts, making foreign experts involved would help to build a more reliable and trusted evaluation system. Overall, the rules of ESI funds' monitoring and evaluation should be closer to the rules of H2020 programmes whenever possible. An example of such case could be a shift from a process-centred to a results-oriented project management and control process. Such policy adjustments should lead to a more reliable project selection process and improve R&I performers' ability to successfully participate in H2020 calls.

Increasing the importance of CFLA role

Based on the interview results, it can be concluded that with the purpose of achieving greater and more coherent rules regarding Structural Fund management, more responsibility for programme design should be given to the Central Finance and Contracting Agency (CFLA). Even though programme design and goals are usually set by the Ministries, given that the programmes would be implemented by the CFLA, the proposed distribution of tasks might be the more reasonable and efficient way to handle the funds. It could have a potential to resolve the overabundance of programme designs. Currently, programmes are designed by multiple governmental bodies; and thus, they follow different structures and principles. This, in turn, implies that the candidates applying for funding have to introduce themselves with nuances of the programme design all over again every time when applying for a programme asserted by a different institution. Placing the programme design in the hands of one institution, namely the CFLA, can help standardise this process and, by doing that, possibly save some resources of research and business organisations.

Innovation related policy-making should take into account the entrepreneurial nature of the field

The entrepreneurial discovery principle should be employed not only by the business organisations and PROs, but also by the policy-makers. Such a change in practice could be broken down to make the several

adjustments that are necessary. Firstly, policy-makers would take into account that most of the policy decisions are made under the conditions of limited and/or incomplete information, and most of the initial hypotheses could be partly incorrect. Secondly, the correction of such hypotheses under the entrepreneurial discovery principle is a constant process stimulated by discovery through interaction with the system, i.e. bottom-up feedback. Thirdly, the nature of entrepreneurial discovery requires no penalties be in place for being wrong; however preferably there can be penalties when the feedback from the system is ignored. The introduction of such an approach would also require some changes on the part of the European Commission, as, according to the representatives of the managing authority interviewed, the current system and attitude within the EC are not always compatible with the entrepreneurial discovery concept. Without introducing these principles, the opportunity costs of the changes (at any level – member state, ministry, department or project) are very high; therefore only a few decision makers are willing to take such risks. It mostly results in policies that are simply the continuation of old practices.

Developing effective mechanisms against agency problems related to EU fund usage

Given the cases discussed regarding the agency problems related to EU funds, it is crucial that policy-makers draw their attention to it and attempt to take better measures against short-term rent seeking. In the case of Latvia, more focused policy goals and a clearer message pertaining to the current support programmes would better align its efforts with the business and science communities, e.g. hard versus soft types of investment.

Mechanisms that could encourage H2020 participation both on the national and EU levels

Given the low participation rates of Latvian researchers in the Framework Programmes, it is important to discuss the actions that can be taken to increase the activity of the R&I actors with respect to the current programme, Horizon 2020. Firstly, raising awareness about the programme, especially within the business sector, is of crucial importance. One possible way to achieve this is through more active operations of the National Contact Point. Based on the interviewees' opinions, it might not lead to immediate results; however, the situation could gradually improve if more efforts are put into promoting, for example, some of the previous success stories. Secondly, the participation in H2020 could be supported by ESIF – providing funding for applications of selective quality that passed the threshold but were not funded. In order to do so, the prioritisation of such applications should be included in the project selection criteria. There should also be a supportive mechanism in place – prioritisation or a special fund – intended to help organisations find co-financing for projects that received part of their funding from Horizon 2020.

Another method for increasing the lagging economies' participation in Horizon 2020 is through the encouragement of the consortiums, which are usually formed in more developed economies, to make new partners involved. Currently, the consortiums are evaluated by assessing each of the partners and their capabilities; thus, there are opportunity costs associated with working with unknown partners for the first time, even if they look promising, simply because it is an unexplored risk. Thus, allowing the possibility of adding a limited number of risk-free partners to the consortium – ones that would not be evaluated when deciding on the project's eligibility for funding - could, for instance, attract the attention of new partners and organisations from countries like Latvia, and they could end up receiving more invitations to join projects.

Strategies for Smart Specialisation

The Smart Specialisation Strategy is relying heavily on countries being able to establish their unique area of expertise. However, the interviews with Latvian participants of international funding programmes show that most success stories came about when Latvian R&D organisations were getting more specialised in the same, or complementary, area as their partners from more advanced economies. Due to foreign partners' comparative advantage in the same field of science, they chose to outsource and allocate their resources to the most efficient use instead. Consequently, it can be argued that Latvia focusing on similar research fields as the stronger EU economies can also lead to it being invited to join collaborative projects. Moreover, small economies like Latvia's cannot fully cover an entire research area. Looking at specialisation from a broader

geographical perspective, for instance the Baltic Region, could allow the entire region to focus on one or a few fields while each country could fully utilise the narrower niches within it. Thus, Latvia and other lagging economies could be an example demonstrating that the EU-wide Specialisation Strategy should be less strict about finding unique areas of expertise – as in some cases, specialising in complementary areas can turn out to be the more economically sound approach.

Another problem relevant in this context is the generalising of the fields of specialisation that policy-makers have demonstrated in the past. For example, Latvia has a strong competence in organic synthesis, but it is claimed that Latvia specialises in the field of biotechnology and biomedicine. However, neither biotechnology nor biomedicine is the field in which Latvia's industry or scientists have the greatest capabilities, competencies or resources. It is rather organic synthesis and pharmacology. Specialisations listed in "Eye@RIS3" are not selected based on evidence but rather on the general compromise between what fields of science are perceived to be promising and making at least some correlation with business needs.

Changes in public procurement law regarding ESIF

Changes in procurement law that could help increase the efficiency of EU fund related policy-making and the quality of public tenders' outcomes in Latvia, including an increase in the threshold and a reduction in the procedural requirements.

Possibility to convert non-commercial research infrastructure to commercial use

The possibility of converting non-commercial use of research infrastructure to commercial use by simply compensating the difference in support intensities should be developed. It may encourage the broader and more effective participation of the industry in the decisions regarding R&I infrastructure. Currently, due to the penalties [45] of such a conversion, management authority is reluctant to agree to such a possibility. Business is not ready to purchase the expensive R&I equipment in the early phases of research; however it can gradually increase its participation at later stages.

10. REGIONAL ANALYSIS

Not applicable.

[45] In case the MS converts the EU funded research infrastructure to commercial one, it shall return the difference in funding between pure research infrastructure and commercial R&D infrastructure. The MS in such case cannot use residual funding for other development needs.

ABBREVIATIONS

BIRTI	Baltic Innovative Research and Technology Infrastructure
CC	Competence Centre
CFLA	Central Finance and Contracting Agency. Agency under the Ministry of Finance
COSME	Competitiveness of Enterprises and Small and Medium-sized Enterprises, EU Programme
DG JRC	Directorate General Joint Research Centre
EaSI	European Union Programme for Employment and Social Innovation
EC	European Commission
ESIF	European Structural and Investment Funds
EU	European Union
Eye@RIS3	An online database intended as a tool to help strategy development for the Smart Specialisation Strategy
FPs	Framework Programmes for research and technology development; FP7 is referring to the 7th Framework Programme carried out in the period of 2007-2013
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GNI	Gross National Income
H2020	Horizon 2020
HEI	Higher Education Institution
ICT	Information and Communications Technology
IF	Individual Fellowships. Grants under the MSCA for top researchers to work outside their own country
IP	Intellectual Property
IPTS	Institute for Prospective Technological Studies
IT	Information Technology
JRC	Joint Research Centre
KfG	Knowledge for Growth. A scientific unit of JRC-IPTS
KP VIS	Management Information System of the Cohesion Programme (Kohēzijas Politikas Vadības Informācijas Sistēma)
LIAA	Investment and Development Agency of Latvia (Latvijas Investīciju un Attīstības Aģentūra); The English abbreviation – IDAL
MA	Managing Authority
MC	Monitoring Committee
MIS	Management and Information System
MoE	Ministry of Economics
MoES	Ministry of Education and Science
MS	Member States of European Union

MSCA	Marie Skłodowska-Curie Actions
NCP	National Contact Point
NGO	Non-Governmental Organisation
PPP	Purchasing Power Parity
PRO	Public Research Organisation
RIC	Research and Innovation Council
RIS3	Research and Innovation Strategies for Smart Specialisation
R&D	Research and Development
R&I	Research and Innovation
R&D&I	Research, Development and Innovation
S2E	Stairway to Excellence
SF	Structural Funds
SME	Small-Medium Enterprise
STDI	Science, Technology Development and Innovation
SWOT	Analysis of Strengths, Weaknesses, Opportunities, Threats
TDIG	Guidelines for Science, Technology Development, and Innovation 2014-2020
TTO	Technology Transfer Office
VIAA	State Education Development Agency (Valsts Izglītības Attīstības Aģentūra); The English abbreviation - SEDA

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APPENDICES

APPENDIX A. The legal framework for EU fund governance

General conditions regarding EU funding programmes for the 2014-2020 period are set out in the "European Commission–Latvia Partnership Agreement for 2014-2020".[46]

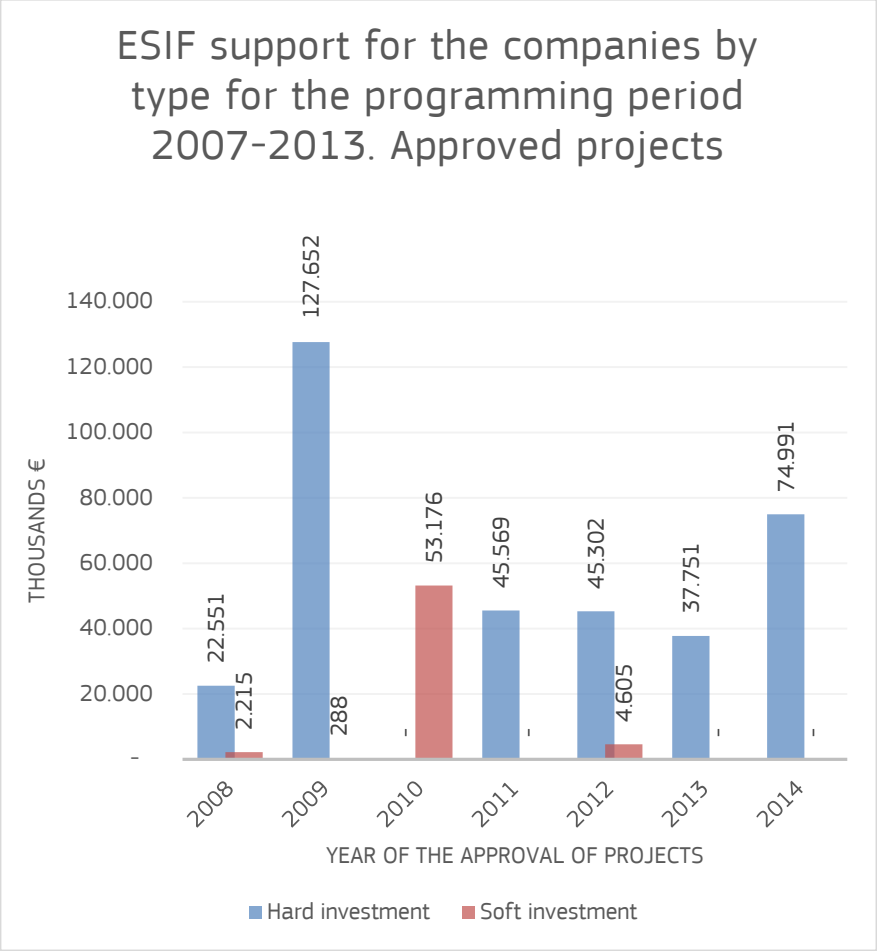
The main principles are regulated by the *"Law on Management of EU Structural and Cohesion Funds 2014 – 2020 Programming Period"*.[47] The law sets out the main principles for the period of 2014 – 2020, including the rights and obligations of institutions and beneficiaries managing EU funds. It also identifies the framework and composition principles of the Monitoring Committee, including assigning the Cabinet of Ministers as a governing body of the EU funding programmes. Finally, the law describes dispute and appeal procedures regarding the decisions of institutions managing EU funds as well as disclosure conditions for information related to the projects. The law was adopted by the Parliament of Latvia on March 07, 2014 and it came into effect on July 11, 2014.

National priorities and guidelines for implementation to promote innovation have been set in the Guidelines for National Industrial Policy for 2014-2020[48] (approved by the Cabinet of Ministers on June 28, 2013). According to the Guidelines, promotion of innovation is one of the fundamental pillars to enhance competitiveness, productivity and physical export volumes. The National Industrial Policy highlights four equally important elements to improve the national innovation system: i) knowledge capacity; ii) innovation supply; iii) demand for innovation; and iv) a knowledge transfer system.

Complementarily, the national innovation policy objectives and actions are set out in the Science, Technology Development and Innovation Guidelines 2014-2020 (TDIG) (approved by the Cabinet of Ministers on December 28, 2013).[49] TDIG includes the Smart Specialisation Strategy for Latvia, which is based on the Guidelines for National Industrial Policy.

[46] "European Commission–Latvia Partnership Agreement for 2014-2020" (Cabinet of Ministers of Latvia, European Commission, 2014. gada), http://ec.europa.eu/contracts_grants/pa/partnership-agreement-latvia-summary_en.pdf.
[47] "The Law on Management of EU Structural and Cohesion Funds 2014 – 2020 Programming Period", *LIKUMI.LV*, skatīts 2015. gada 10. aprīlī, http://likumi.lv/doc.php?id=267471.
[48] Latvijas Republikas Ekonomikas Ministrija, "Nacionālās industriālās politikas pamatnostādnes 2014.-2020.gadam" (Rīga, 2013. gada 18. jūnijā).
[49] Izglītības un Zinātnes ministrija, "Zinātnes, tehnoloģijas attīstības un inovācijas pamatnostādnes 2014.-2020.gadam", 2013. gada 28. decembrī, http://polsis.mk.gov.lv/view.do?id=4608.

APPENDIX B. ESIF support for the companies by type: Approved projects in the period 2007-2013.[50]



[50] Table compiled by the author. Based on data provided by: Latvian Innovation and Development Agency (LIAA).

APPENDIX C. Micro level indicators of the RIS3[51]

RIS3 MICRO LEVEL INDICATORS *(R (Result) – Result indicator; I (Impact) – Impact indicator; O (Output) – Output indicator)*		**Programmes that contribute towards achieving the investment indicator**	
		SF	National budget
R	Income from licences/patents of scientific institutions (EUR)	Research and R&D infrastructure development programmes, Competence centre and Technology transfer programme (SO 111, SO 112)	Base funding; National research programmes
O I	Business co-funding of R&D projects (EUR)	Research and R&D infrastructure development programmes (SO 111, SO 112)	Base funding; National research programmes
O	The number of the companies that have received support for introducing new products or technologies	Support programme for introducing new products/technologies (SO 112)	Corporate income tax allowances
I	Company income from new products or technologies introduced (EUR)	Competence centre programme (SO 112)	-
I	New companies established by scientific institutions (spin-offs)	Technology transfer support programme (SO 112)	Base funding, Higher education funding
O	The amount of loans granted to micro and small enterprises (EUR)	Financial instrument support	-
O	The number of businesses that have received preparation and start-up capital support in their early development phase, risk capital funding in the expansion phase	Financial instrument support	-
O	The number of new scientists supported for implementing post-doctorate research	Post-doctorate support programme (SO 111)	-
O I	Newly created jobs, including the jobs for scientists in the public sector/business sector	Competence centre programme (SO 112), Post-doctoral support programme (SO 111), Business incubators	-
R	Funding raised for H2020 confirmed	Support programme for international cooperation in	"Baltic Bonus" initiative

[51] Table by the Ministry of Education and Science of the Republic of Latvia from "Smart specialization strategy monitoring system"

I	project applications (LV part; EUR)	research and innovations (SO 111)	
R	Scientific articles published in the international data bases *(Scopus, Web of Science)*	Research programme (SO 111), Competence centre programme (SO 112)	Base funding; National research programmes, Higher education funding, Support for fundamental and practical research
R	Employees trained	Training support programmes (SO 112, SO 822, SO 841)	-
O	The number of MA students and doctoral students involved in R&D projects	Research programme (SO 111), Competence centre programme (SO 112)	National research programmes, Higher education funding

APPENDIX D. Innovation related business support programmes, project data in thousands of EUR.[52]

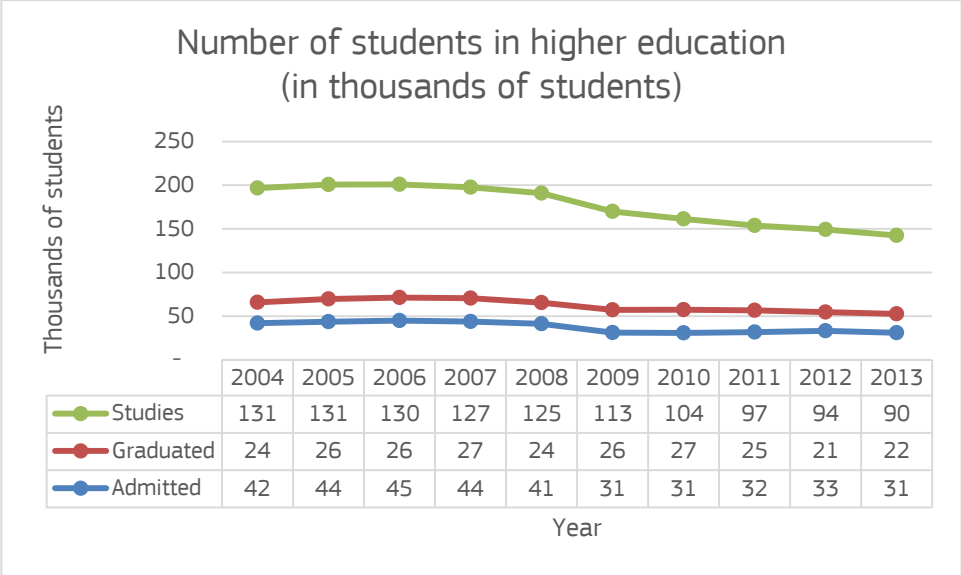
Programme name	Type	Approved	Rejected	Total	Share of programme in all approved projects	Rejection rate
Cluster programme	Soft	4 605	2 675	7 280	1.1%	37%
Co-financing to the investments in micro- and small-sized enterprises operating in the specially assisted areas	Hard	28 233	46 979	75 212	6.8%	62%
Competence centres	Soft	53 176	18 301	71 477	12.8%	26%
Contact points of transfer of technologies	Soft	2 201	530	2 730	0.5%	19%
Development of new products and technologies	Soft	9 737	27 097	36 834	2.4%	74%
Development of new products and technologies - aid for industrial property rights	Soft	303	221	524	0.1%	42%
Development of new products and technologies – aid for implementation of new products and technologies in production	Hard	61 109	46 002	107 111	14.8%	43%
High value-added investments	Hard	254 454	224 318	478 773	61.4%	47%
New product and technology development in SMEs	Soft	283	217	500	0.1%	43%
Total		**414 101**	**366 340**	**780 441**		

[52] Table compiled and data provided by LIAA in 2015.

Appendix E. The limited absorptive capacity

In the long-term, there are some positive trends indicated for the R&D sector in Latvia. For example, the proportion of students selecting natural sciences or engineering is slowly, but consistently, increasing. University admission data listed by fields presented by MoES shows that since 2004, the relative popularity of natural sciences and engineering studies as a percentage of the total number has increased from approximately 20 percent to almost 30 percent (Table 3).

However, the increase in relative popularity of R&D studies does not solve the issue, as the overall number of students in Latvia has been decreasing since 2004 (Figure F1). This trend, together with the ageing population of researchers, will make the problem of limited absorptive capacity of EU funds worse. Therefore, an immediate focus on, and more attention should be paid to, the human resources available in the R&D sector.



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Studies	131	131	130	127	125	113	104	97	94	90
Graduated	24	26	26	27	24	26	27	25	21	22
Admitted	42	44	45	44	41	31	31	32	33	31

Figure E1. Number of students in higher education in Latvia. Data source: Ministry of Education and Science

In the academic year 2014/2015, the total number of students in higher education institutions was 85,900, which is 4% less than a year ago. However, in 2012, when Latvia still had 97,000 students, the students in tertiary education comprised 4.85% compared to a 4% average in the EU. Factors that have caused a reduction in students are demographical and economic crises, which have reduced the ability of the population to pay for higher education and have caused a high number of young people to emigrate to other countries.

Eight technology transfer points were created at universities in Latvia, their annual budget is approximately €50,000 per year, which allows them to provide only limited services to their respective university or businesses. As verified in the interviews with transfer offices, the average contact point dealt with one or two businesses per week, despite the fact that some universities have over 540 academic personnel and 460 research personnel.

Table E1. Relative popularity of different fields of science and technology; student admission data.[53]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1- Natural sciences	4.9%	5.1%	4.9%	4.6%	5.2%	7.2%	6.8%	6.7%	6.8%	6.9%
2- Engineering and technologies	13.5%	14.9%	14.9%	15.4%	15.6%	19.7%	19.1%	19.3%	19.1%	20.5%
3- Medicine and life sciences	3.9%	4.4%	5.0%	5.0%	5.4%	7.4%	9.3%	9.7%	11.3%	12.7%
4- Agriculture	1.1%	1.1%	1.0%	0.9%	0.9%	1.5%	1.3%	1.3%	1.3%	1.3%
5- Social sciences	68.7%	65.1%	65.0%	64.9%	63.3%	53.4%	52.9%	52.4%	51.2%	48.3%
6- Humanities	6.6%	7.3%	7.5%	7.6%	8.0%	9.3%	8.9%	8.4%	8.0%	8.0%
8- Other, security, government	1.3%	2.1%	1.6%	1.6%	1.7%	1.5%	1.7%	2.2%	2.3%	2.4%

[53] Source: Ministry of Education and Science.

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